A CHILTON PUBLICATION

the Iron Age

E NATIONAL METALWORKING WEEKLY

January 28, 1954

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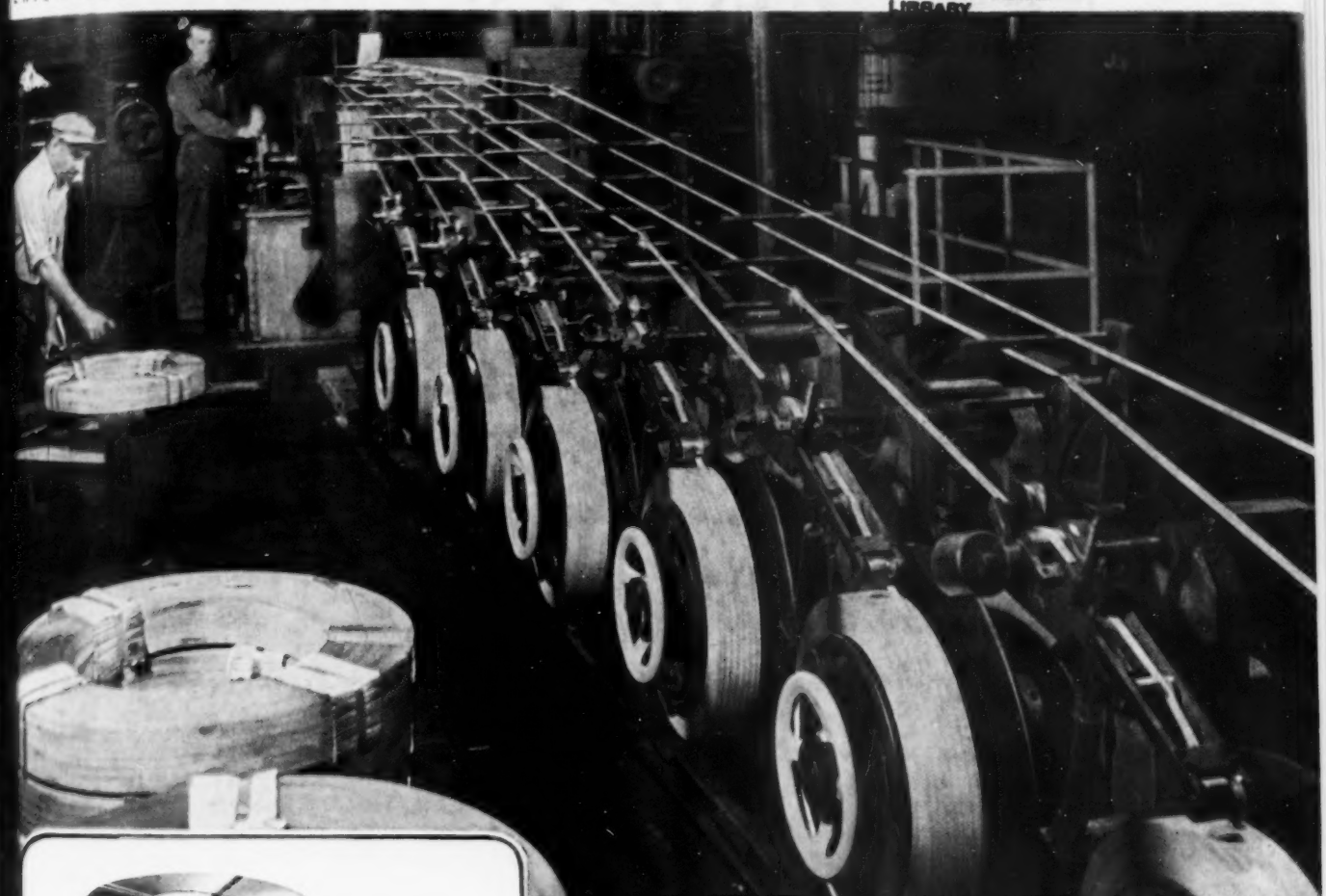
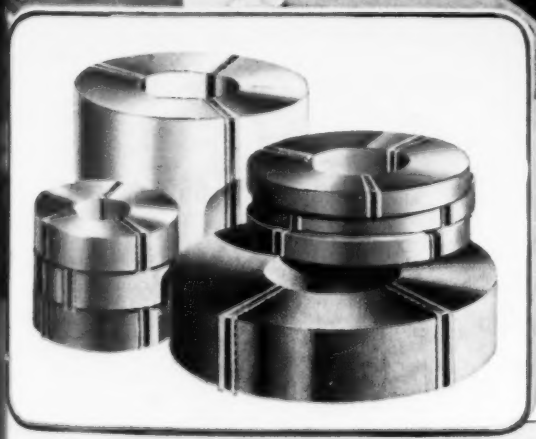




More Than a Product—A Production Idea!

Here's a challenge to your imagination: Consider Thomas Strip . . . strip steel cold rolled to exacting tolerances . . . then coated with copper, zinc, brass, nickel, lacquer, tin, or lead alloy. Add the luster of planished or buffed finishes. *Weigh the advantages of special finishing on equipment such as the slitter above.* Then picture its use in your product designs. Chances are good that you'll come up with a product of more eye-appealing quality; and you will be able to make it at lower cost through savings in fabrication, lower plating costs, longer die life, and maximum production per pound. Write for details today.

Thomas Strip®

COLD ROLLED STRIP STEEL

Thomas Strip Division

Pittsburgh Steel Company • Warren, Ohio

How many SPARKS in a Spark Plug?

Surprising, the confidence that people have in spark plugs. No one stops to question how many "sparks" they're good for, because long-life performance has come to be taken for granted. Yet, when you get right down to it, you'll find good reasons for this complete consumer confidence. And, from a "sparking" point of view, perhaps the most important is the almost universal use of special Hoskins alloys for the vital electrode wires.

Producing the wire that sparks your car to power is a tough and tricky business. It requires special care in the selection of raw materials. Special melting and production techniques. Plus extremely close control over alloy composition and uniformity of quality throughout the entire manufacturing process.

Yet that's exactly the kind of alloy that Hoskins is qualified to produce best. For, among the other quality-controlled alloys developed and manufactured by Hoskins are: Alloy 717—for facing engine valves; Alloy 785—for brazing belts; Alloy 502—for countless heat resistant mechanical applications. Then, too, there are the Chromel-Alumel thermocouple alloys . . . guaranteed to register true temperature-EMF values within specified close limits. And, of course, Hoskins CHROMEL . . . the *original* nickel-chromium resistance alloy used as heating elements and cold resistors in countless different products.

Hot stuff for hot jobs! Hoskins Alloy 502 is ideally suited to many mechanical-structural applications.

Heating elements made of Hoskins Chromel deliver full-rated power throughout their long and useful life.

Chromel-Alumel thermocouple alloys accurately measure exhaust temperatures of jet aircraft engines.

Chromel® NICKEL CHROMIUM WIRE

HOSKINS

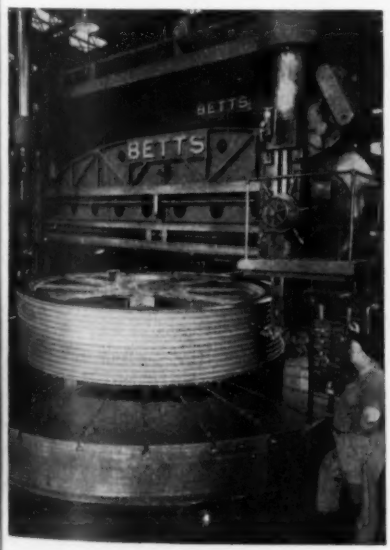
MANUFACTURING COMPANY

4445 LAWTON AVENUE, DETROIT 8, MICHIGAN

BIG WHEEL

This 37-ton wheel, a product of our Weldment Shop, is the first of four counterweight sheaves for the new vertical-lift bridge between Queens and Welfare Island, New York. Husky cables, passing over the sheaves, will carry two 515-ton counterweights for raising and lowering the lift span.

Heaviest component of this sheave is the rolled plate rim, 6 in. thick and 3 ft wide. It is made of two plates which were cold-formed into semi-circular shape, then butt-welded together to form a complete circle. Into this ring of steel we securely welded the sturdy web section, with its forged and center-bored hub.



Machining of cable grooves in 25-ft vertical boring mill. Bethlehem is equipped to machine any weldment to your specifications.

After welding, the sheave was heat-treated to relieve possible stresses, then moved to the machine shop for finish-machining and cutting of the cable grooves.

This wheel is a large weldment, but is well within the range our Weldment Shop is used to handling, which includes jobs of all sizes and types; from huge and complex presses, kilns and autoclaves, to smaller and simpler pipe work, vessels and machine parts.

Whatever kind of job you may have in mind, we can probably cut your manufacturing costs by trimming excess weight – without sacrificing strength or rigidity.

You can avoid design limitations with Bethlehem Weldments. We can bend, press, shape and flame-cut the rolled steel plates prior to welding, and incorporate forgings, castings and structural shapes, if required. Any necessary machining operations are ably handled in our well-equipped machine shops.

Next time you require a machine part or finished assembly, we suggest that you consider the advantages of Bethlehem Weldments. The nearest Bethlehem office will gladly furnish further information.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM WELDMENTS

BETHLEHEM STEEL

The Iron Age

Vol. 173, No. 4, January 28, 1954

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NEWS DEVELOPMENTS

SHELL MOLDING BRINGS NEW FOUNDRY ERA — P. 55
Automation and modern techniques are literally bringing a new era to the ancient foundry industry. Here's how Walworth Co. shifted from a green sand bronze foundry to a modern, mechanized shell mold foundry. Shift brought greater efficiency, more flexibility, more economy and better working conditions.

GM PUTS BILLION IN THE PROSPERITY POT — P. 58
General Motors' President Harlow H. Curtice tossed a billion dollars into the nation's economy last week, at the same time generated many times that much in terms of optimism. While that commodity can't be calculated in dollars, a $1 billion capital improvement program draws compound interest.

FIRST CERRO BOLIVAR ORE ARRIVES IN U. S. — P. 61
Culmination of years of cooperative effort between U. S. Steel's Orinoco Mining Co. and the government of Venezuela came last week when U. S. Steel Board Chairman Benjamin F. Fairless gave the go-ahead to Craneman Frank Rossi at the ore dock. First shipment was 6000 tons, will total 3 million tons in '54.

NO BLEEDING FROM PLANNED BUDGET CUT—P. 62
Proposed $5.3 billion cutback in government spending for fiscal 1955 will not shake the economy. But it may cause some trouble for a few businesses. A new spending pattern is emerging. Defense outlay will remain about $35 billion for the next 3 years while other expenditures are cut.

DIEMAKERS HINT NEW CHRYSLER FOR 1955 — P. 72
Chrysler Corp. may be revising the entire timetable for its divisions, moving up the date of complete body changes to hit the 1955 market. This is concluded from the volume of orders for new dies, the late date of launching the retooling program and the pressure by the firm for early delivery.

ARMY TO TRIM BUYING AND INVENTORIES — P. 77
First effect of the Army decision to slow procurement and "live off the pantry shelf" in the months ahead is to be a trimming of orders to $5 billion by June 30. Comparison: Outstanding orders were valued at $11 billion on July 1, 1953; at $13 billion a year ago. Inventories surveyed at $30 billion.

the Week in Metalworking

ENGINEERING & PRODUCTION

INVESTMENT CASTING CYCLE SHORTENED — P. 115
Development of a new precoating material and use of plastic patterns and centrifugal casting have greatly reduced the time cycle for ferrous investment castings. Low equipment costs plus high output per worker make the short cycle process competitive with other methods for producing intricate parts.

INERT-GAS WELDING CUTS DOLLY COSTS — P. 118
New techniques have made inert gas-shielded metal arc-welding competitive with older processes for joining mild steel. Now, two press-formed sections are butt welded to form a trailer dolly wheel. Welds have 100 pct penetration. Elimination of post-weld cleaning and speed of welding are advantages.

BASIC DATA ON TITANIUM MACHINABILITY — P. 120
Here's basic information on the machining of titanium culled from 28 engineering studies made by University of Michigan research engineers. Best tool shapes for long service life are described for turning, shaping and broaching. Data on feeds, speeds and power are also included in this second of three articles.

NITRIDING IMPROVES TITANIUM PROPERTIES — P. 124
Nitrided titanium can be used on applications such as bearings and where low friction requirements are needed. Hardness and resistance to galling and seizing are increased. Creep-rupture properties of titanium and its alloys are improved in the 1000° to 1200° F range. Oxidation resistance at 1200° F is improved.

PRESSURE BLAST FURNACES SAVE ON COKE—P. 128
Pressure operation of blast furnaces, a practice pioneered by U. S. firms, is being well received by steelmakers in Europe. One furnace is in operation and six more are in the works. The method improves gas-solid contact and raises output of pig iron by 12½ pct, it is reported. Iron is produced from leaner ores.

NEXT WEEK—INDUSTRY STYLING AND MODERN DESIGN
Styling affects almost all items sold. Even with completely functional parts, pleasing appearance increases saleability. Good styling frequently improves functional qualities. On machine tools, good design promotes worker efficiency and increases pride of workmanship. Styling requires close company planning.

MARKETS & PRICES

SCRAP DEALERS FRET OVER DEPRESSED MARKET—P. 59
Scrap dealers and brokers found little to cheer about as they held their annual meeting in the shadow of a depressed market. Abundant ore supplies make pig iron a prime competitor. Dealers remote from mills hurt most by high freight rates. Mechanization makes firms feel ups and downs of business more.

AUTOS GIVE PUSH FOR BIG YEAR IN DIES — P. 67
Midwestern die manufacturers, particularly those tied in with the auto industry, are bracing for one of their biggest years in terms of civilian programs. This comes in the face of only spotty business in recent months. New auto models are towing the industry out of the decline.

LEASING MAY EASE TOOL REPLACEMENT SNARL—P. 83
Members of the machine tool industry are working out flexible leasing plans to speed replacement of obsolete equipment. The customer has the choice of buying or returning the tool. Kearny & Trecker program has three plans, which are detailed here, for leasing any tool in the firm's line.

OPTIMISM SIGN OF ECONOMIC STATESMANSHIP—P. 85
Men in politics doing less have been cited for statesmanship—so we call the doctrine of optimism in recent statements of four industrialists economic statesmanship. It must have braced the country's economic confidence—and shamed those whooping it up for a politically convenient recession.

EXPECT LITTLE CHANGE IN THE STEEL MARKET—P. 139
Those who keep expecting a strong upturn in the steel market are due for a disappointment. There is little likelihood that steelmaking operations will vary more than a few points in the next several weeks. Inventory corrections are being completed and consumers are returning to the market, but backlogs are steady.

METALS QUIET FOLLOWING PRICE REDUCTIONS—P. 142
Activity in metal markets following a price cut is usually limited and last week was no exception in lead and zinc. But the London market is rebounding and it may foreshadow increases here. Zinc smelters have now trimmed output by about 8000 tons monthly—but it still isn't enough.

50 lbs. oil pressure

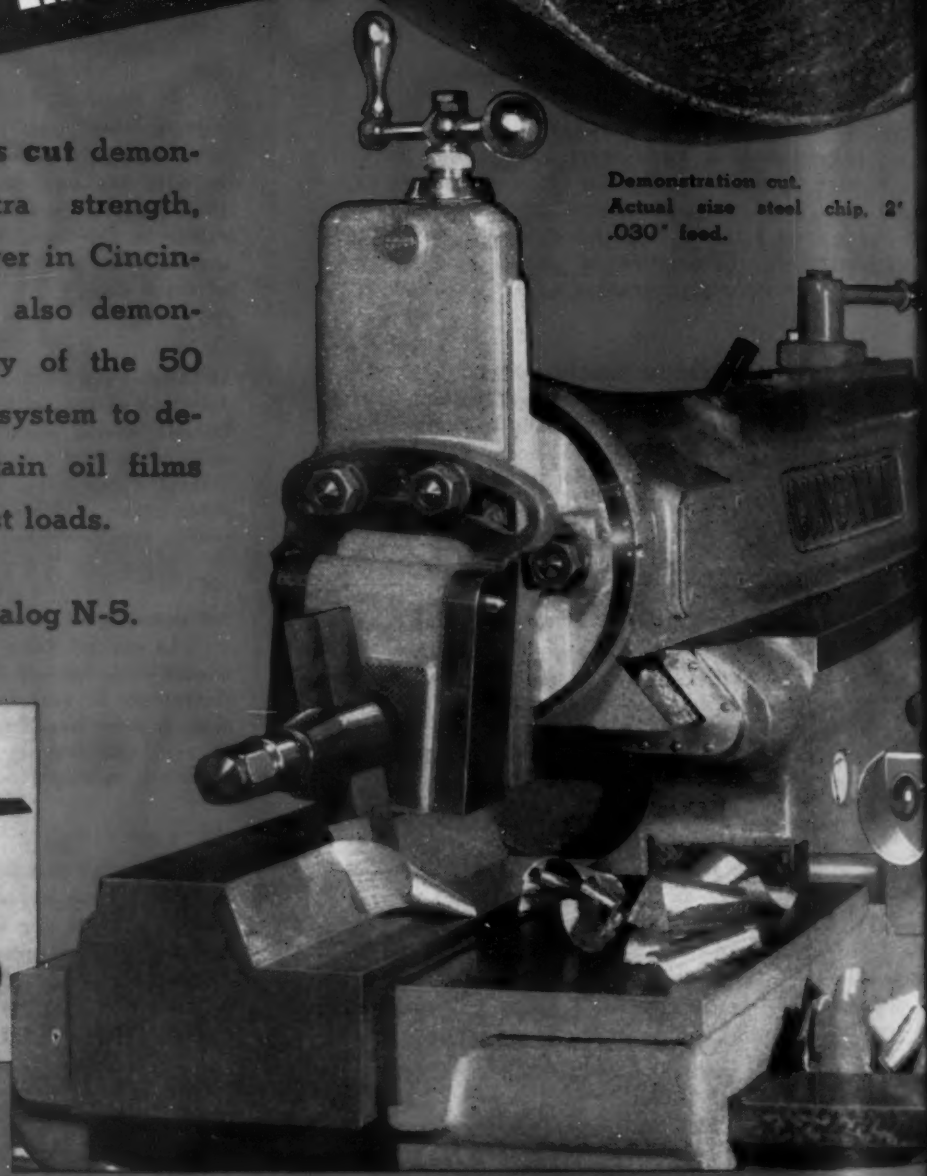
IS NECESSARY WITH A CUT LIKE THIS...

Demonstration cut. Actual size steel chip. 2" .030" feed.

This tremendous cut demonstrates the extra strength, rigidity, and power in Cincinnati Shapers. It also demonstrates the ability of the 50 p.s.i. lubrication system to develop and maintain oil films under the heaviest loads.

Write for Catalog N-5.

50 p.s.i. system includes 50 micro filter, settling basin and reservoir. Transmission runs submerged in oil.



CINCINNATI

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS • SHEARS • BRAKES

Fatigue Cracks

by William M. Coffey

Progress

It was bound to come.

One of the most modern iron and steel scrap plants in the world is nearing completion on a 16-acre site at Kenilworth, Md. Being built by Luria Engineering Co. for Joseph Smith & Sons, it has one very unique feature.

A public address system is being installed so that operating executives will be able to issue directions to yard employees from their offices. These offices will have large "picture" windows providing a clear view of the entire yard, including the baler and overhead crane. Mr. Smith stated that the p.a. system promises to become a major factor in speeding up and improving the efficiency of the yard operations.

"I see 'ya, Pizzuti. Get out from behind that crane and lift that baler, boy." Getting harder and harder to goof off.

Exquisite?

We receive from time to time news releases from public relations outfits. We have regularly been on the list for the "NEWS of Allergy Research and New Developments." The following isn't a bit amusing for the people involved, but here goes anyway.

Wine taken at Mass by a young Boston catholic priest proved to be the one and only cause of hay fever, bronchial asthma and hives.

* * *

Inhalation of steam arising from boiling corn, as well as corn on the cob, caused asthma in a 37 year old woman.

* * *

A Philadelphia newspaper reporter for 20 years was forced to give up his job when an allergist found his asthma was due to fresh newsprint.

* * *

When a diabetic patient, after six years, changed from using insulin of pork origin to that of beef, chronic stomach cramps disappeared.

* * *

Put on a bland diet for a case of ulcers, symptoms were found to be from the eggs the woman was directed to eat.

* * *

After a long search, toothpaste was found to be the offending agent of attacks of itching, swelling and blister formation of the left hand of a 46 year old woman. The doctor discovered that at least once a week she thoroughly cleaned her false teeth by gripping them in the palm of her left hand.

This news bulletin was headed EXQUISITE SENSITIVITIES REPORTED IN CURRENT ALLERGY LITERATURE.

Cheer Up, Chum!

Here's some real good news. Scientific research has now made it possible by the use of a medicated troche *(the dictionary says troche is a medicated lozenge and that lozenge is a rhombus with all its sides equal, having two acute and two obtuse angles)* to help the smoker in his fight for abstinence. This news comes from Westco Chemicals of Beverly Hills, Calif. They say that at long last the tobacco addict may look forward to aid when he tries to stop smoking. In addition to professional advice or admonition, the smoker will be able to get an "assist" in the form of a pleasant tasting formulated troche *(a rhombus with all its sides equal, having two acute and two obtuse angles)* compounded to dissolve in the mouth very slowly. "Known as Caronian Trokes they are harmless and may be taken as often as desired."

So cheer up, my boy, and remember you can always reach for a Troke instead of a smoke. We'd walk a mile for a Troke.

Puzzlers

All these fine people soluted the King's Orchard puzzler, the answer to which we printed last week: Rose A. Gibbons, G. A. Alsterlund, Donald Bevans, Thos. P. Vicale, Mark Perucich, Milton Kester, John Cluck, Fred O. Hisington, George F. Bickal, J. J. Brugman, A. Governale, George D. Clarke, Janice Day, Harry M. Morgan, Sidney Lewis, Joseph P. Jurgensen and Mr. Rice.

New Puzzler

Here's another one from our friend Bill Braasch and his young daughter.

A wall 27 feet high is 8 feet from the side of a tall building. What is the length of the shortest ladder from the ground over the wall to the building?

now you can produce trouble-free,

FREE-MACHINING STEEL with FOOTE MANGANESE SULPHIDE

This fume-free ladle additive increases quality and reduces the cost of producing high sulphur, free-machining steels . . . with these plus advantages:

1. *improved hot rolling behavior*
2. *fewer surface defects*
3. *fewer diversions*
4. *lower conditioning costs*
5. *low carbon content saves heat time*

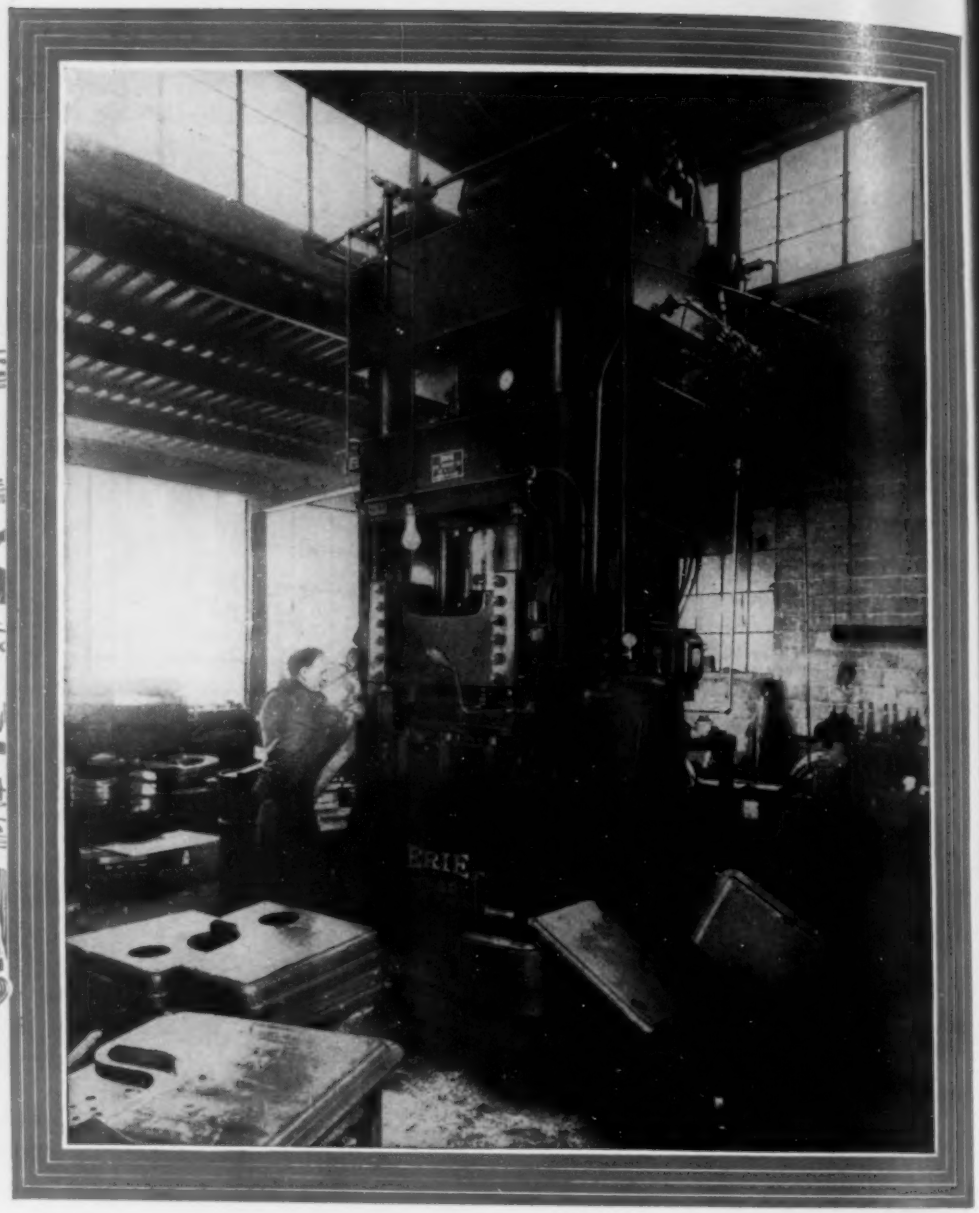
TYPICAL ANALYSIS	
Manganese	53%
Sulphur	32%
Carbon	.22%

Size: 1" x 5" lump

write for further details!

Foote MINERAL COMPANY

438 Eighteen W. Chelten Bldg.
Philadelphia 44, Pa.



FOR SPECIAL METAL FORMING PRESSES... CONSULT WITH US...

TYPICAL of many Hydraulic Presses built to customer specifications by Erie Foundry Company is this 500 ton metal forming press operating in the plant of a large eastern manufacturer. The importance of sound design and rugged construction becomes equally evident on production cost sheets whether the equipment is highly specialized or standard. For this practical reason special precision hydraulic presses by Erie Foundry Company are widely preferred. You are assured of the results you want when you take advantage of the half century of experience represented in Erie Foundry Company presses. Write for bulletin 350.

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Dates to Remember

Meetings

JANUARY

SOCIETY OF PLASTICS ENGINEERS, INC.—Annual national technical conference, Jan. 27-29, Royal York Hotel, Toronto, Ont. Society headquarters are at 513 Security Bank Bldg., Athens, Ohio.

AMERICAN MANAGEMENT ASSN. — Marketing Conference, Jan. 27-29, Roosevelt Hotel, New York. Association headquarters are at 330 West 42nd Street, New York.

THE COLORADO MINING ASSN.—National western mining meeting, Jan. 28-30, Denver. Association, 204 State Office Bldg., Denver.

FEBRUARY

AMERICAN SOCIETY FOR TESTING MATERIALS—Spring meeting, Feb. 1-5, Shoreham Hotel, Washington. Society headquarters are at 1916 Race St., Philadelphia.

THE INSTRUMENT SOCIETY OF AMERICA — Annual Regional Conference, Feb. 4, Statler Hotel, New York. Society headquarters are at 921 Ridge Ave., Pittsburgh.

AMERICAN ELECTROPLATERS' SOCIETY—Interim meeting, Feb. 13, Royal York Hotel, Toronto. Society headquarters are at 445 Broad St., Newark, N. J.

AMERICAN FOUNDRYMEN'S SOCIETY —Spring meeting, Feb. 15, Chicago. Society headquarters are at 616 S. Michigan Ave., Chicago.

ASSN. OF IRON & STEEL ENGINEERS —West Coast meeting, Feb. 15-17, Statler Hotel, Los Angeles. Association headquarters are at Empire Bldg., Pittsburgh.

NATIONAL WELDING SUPPLY ASSN. —Annual convention, Feb. 15-17, Fairmont Hotel, San Francisco. Association headquarters are at 1900 Arch St., Philadelphia.

AMERICAN INSTITUTE OF MINING & METALLURGICAL ENGINEERS — Annual meeting, Feb. 15-18, Metals Branch, Hotel McAlpin; Mining and Petroleum Branches, Hotel Statler, New York. Institute headquarters are at 29 W. 39th St., New York.

MARCH

STEEL KITCHEN CABINET MANUFACTURERS ASSN.—Mar. 3, New York City. Association headquarters are at 1008 Engineers Bldg., Cleveland.

AMERICAN SOCIETY FOR METALS— Midwinter meeting, Mar. 4-5, Statler Hotel, Boston. Society headquarters are at 7301 Euclid Ave., Cleveland.

AMERICAN GAS ASSN. — Transmission and storage conference, Mar. 4-5, Jung Hotel, New Orleans. Association headquarters are at 420 Lexington Ave., New York.

NATIONAL ELECTRICAL MANUFACTURERS ASSN.—Mar. 7-11, Edgewater Beach Hotel, Chicago. Association headquarters are at 155 E. 44th St., New York.

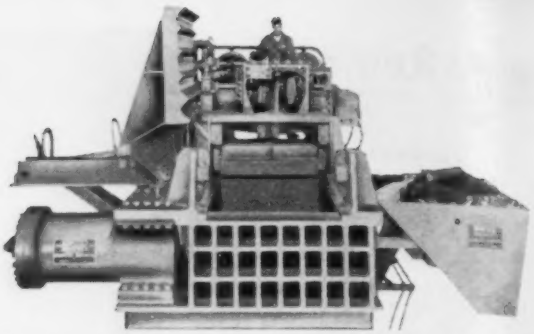
STEEL FOUNDERS' SOCIETY OF AMERICA—Annual meeting, Mar. 16-17, Edgewater Beach Hotel, Chicago. Society headquarters are at 920 Midland Bldg., Cleveland.

NATIONAL ASSN. OF CORROSION ENGINEERS—Annual meeting, Mar. 15-19, Municipal Auditorium, Kansas City. Association headquarters are at 1061 M & M Bldg., Houston.

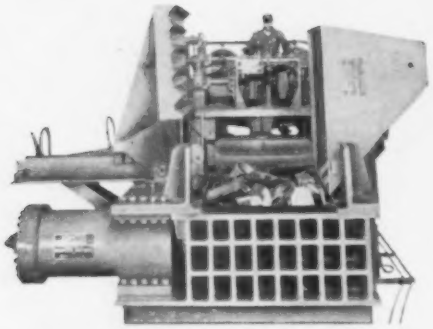
NATIONAL ASSN. OF WASTE MATERIAL DEALERS, INC.—Annual Convention, Mar. 15-17, Waldorf-Astoria, Hotel, New York. Association headquarters are at 271 Madison Ave., New York.

STEEL SHIPPING CONTAINER INSTITUTE, INC.—Annual meeting, Mar. 23-25, Biltmore Hotel, Palm Beach, Fla. Institute headquarters are at 600 Fifth Ave., New York.

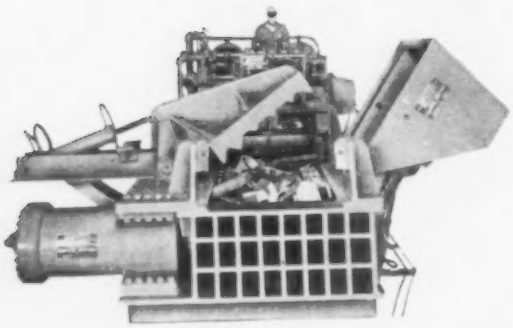
RAIL STEEL BAR ASSN.—Annual meeting, Mar. 24-25, Jung Hotel, New Orleans. Association headquarters are at 38 S. Dearborn St., Chicago.



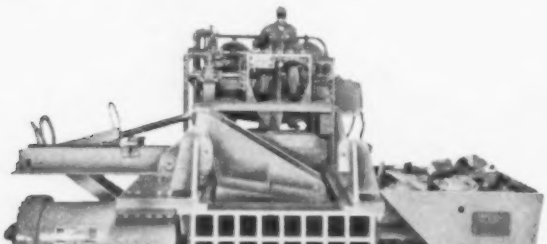
1. Here Skip Pan has been loaded.



2. Skip Pan dumps load into charging box.



3. Auxiliary-Compression Door starts its compression stroke as Skip Pan returns to be re-loaded.



4. Auxiliary-Compression Door crushes scrap into charging box.

5. At right the Auxiliary-Compression returns to up-right position and charging box door closes. Scrap is baled and then ejected. Skip Pan has been re-loaded and is ready to re-fill the charging box.

Dempster-Balester Auxiliary-Compression Door becoming a MUST for scrap metal baling

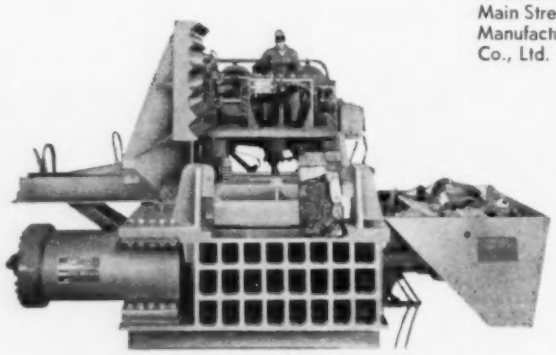
Before buying a scrap metal baling press, it is important to know that the Auxiliary-Compression Door is available exclusively for Dempster-Balesters. This door completely eliminates in some operations and materially reduces in others the costly process of tying up two or three extra men as arrangers. In addition, the hydraulically operated Auxiliary-Compression Door normally crushes scrap with one stroke . . . permitting charging box cover door to close immediately. This means a tremendous increase in production.

This increase in production and savings in man-hour costs have made the Auxiliary-Compression Door virtually indispensable for the greatest economy in scrap metal baling.

A Dempster-Balester Model 600 is shown in operation with Skip Pan Loader and Auxiliary-Compression Door. Note that every operation in the baling cycle is hydraulically controlled from the moment scrap is dumped into Skip Pan Loader until finished bale is ejected.

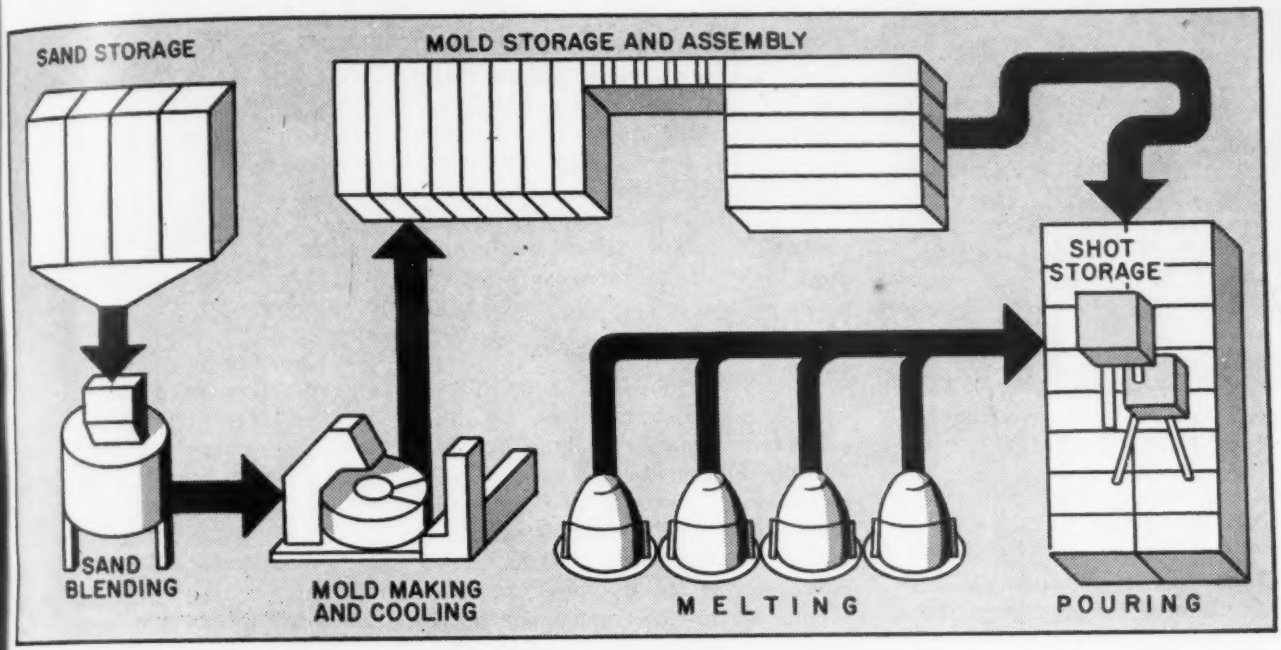
Write us for complete information. Dempster-Balesters are manufactured exclusively by Dempster Brothers, Inc.

IN CANADA: Sold by W. P. Favorite Co. of Canada, Ltd., 418 Main Street East, Hamilton, Ontario. Manufactured by Hamilton Bridge Co., Ltd.



DEMPSTER BALESTER

DEMPSTER BROTHERS, 314 Dempster Bldg., Knoxville 17, Tenn.



Shell Molding Brings New Foundry Era

Firm shifts from green sand to shell molds . . . Automatic equipment, conveyors speed processing . . . Casting quality improves . . . Effect savings in metal, manpower, money.

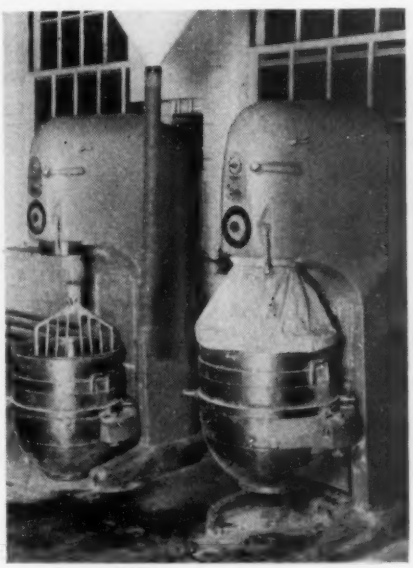
Automation and modern techniques are literally bringing a new era to the ancient foundry industry. Greater efficiency, more flexibility, better economy and cleaner, safer working conditions all result from the greater mechanization made possible by the shell molding process first brought to the U. S. in 1950.

Showing what can be done, Walworth Co. has started operating its modernized Boston foundry. In producing shell molds, the firm uses resins by the Bakelite Co. and silicone lubricants developed by Linde Air Products Co., both divisions of Union Carbide & Carbon Corp.

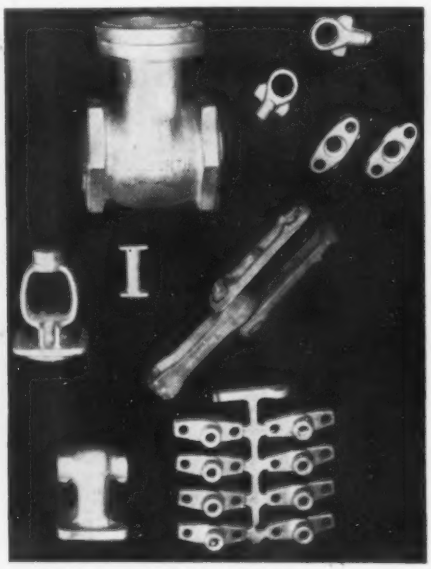
Originally a green sand bronze foundry, it is now adapted to mass production of valves, threaded pipe fittings, pipe flanges and other products cast in bronze, brass, carbon or stainless steel, aluminum and other alloys.

Heart of the operation is a 240-mold-per-hr automatic shell molding machine. Mold assembly, pouring and casting machinery plus extensive conveyor systems complete the mechanization. Walworth developed, designed and markets this machinery which is made by Link-Belt Co.

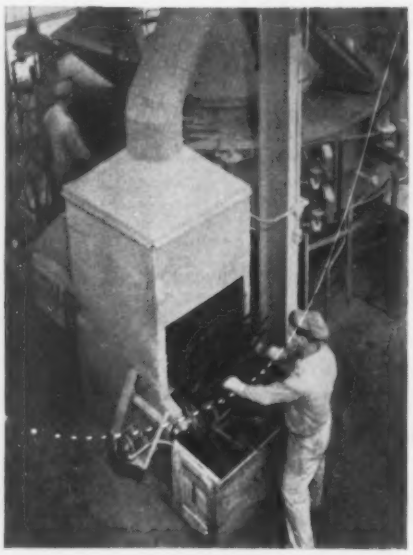
Resin-bonded sand shells are turned out—one every 15 seconds—like this: Phenolic resins and sand are mechanically blended with a



MIXERS are used to blend sand, phenolic resins and wetting agent for mold.



SHELL-MOLDED castings are smoother, can be held to closer tolerances.



MOLD making machine takes eight patterns, completes shell every 15 seconds.

wetting agent. This mixture is poured into an eight-station rotary mold-making machine which accommodates eight patterns at once. Mold patterns are pre-heated at the first three stations, the resin-sand mixture is poured at one, curing is done at the next three and the completed shell mold is automatically ejected at the last.

Pattern plates measure 16 x 28 in. and can be used to form both halves of a 14 x 16-in. complete shell mold.

After the shells are cured and cooled, cores are inserted and the two halves of the mold are placed in the mold-closing machine. Adhesive is applied to the edges of one shell and the mating shell is positioned over it. The closing machine automatically applies uniform pressure over the entire mold to insure complete joining.

Ladles On Conveyors

Conveyors take the completed mold either to storage racks or directly to the pouring machine. Molds are placed in steel boxes carried by a monorail conveyor at about 6 fpm. Steel shot is automatically poured in around the shell to support it against internal pressure developed during the actual pouring of molten metal.

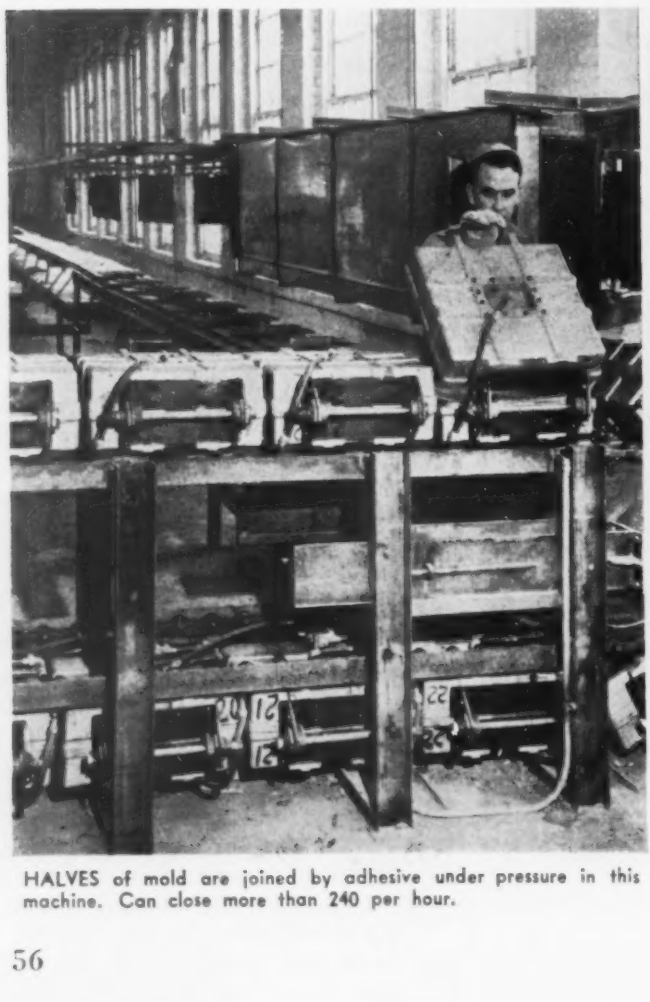
Pouring ladles, with a capacity of about 200 lb each, travel on other monorail conveyors from the melting furnaces. An average of 12 to 16 molds are filled by each ladle.

Next the steel box moves to another automatic station where shot, solidified casting and mold are dumped. Shot is recycled and the casting and mold are transferred automatically to a cooling conveyor, thence to a shakeout conveyor which separates most of the mold from the casting.

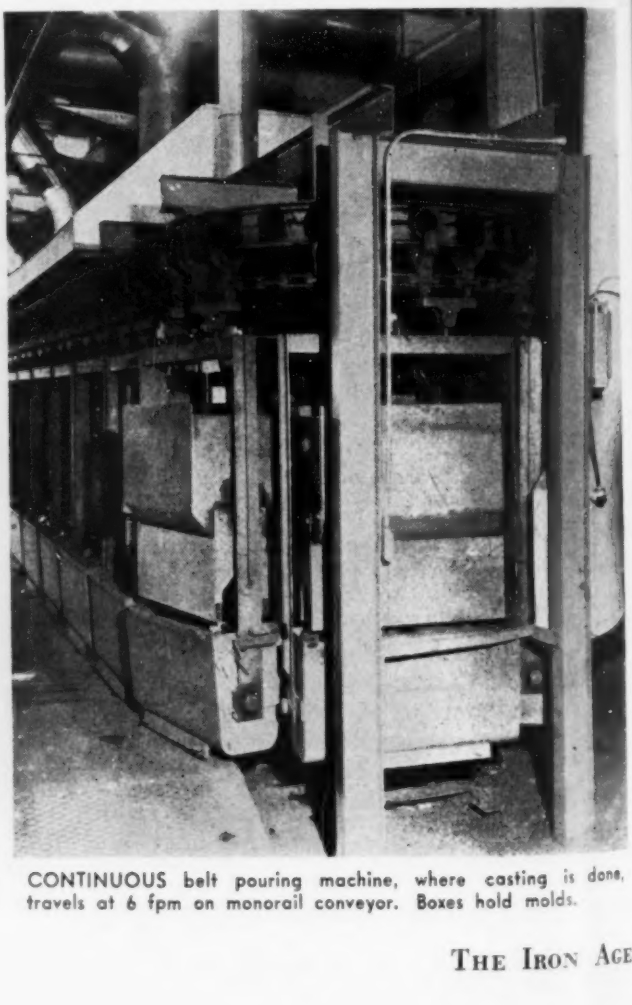
Gives Greater Yield

What advantages did Walworth foresee when it decided on this metamorphosis? Answer is many. Closer tolerances obtained with shell molding result in a substantial saving of casting metal. Mold accuracy also reduces time, labor and metal required to machine the casting down to tolerance.

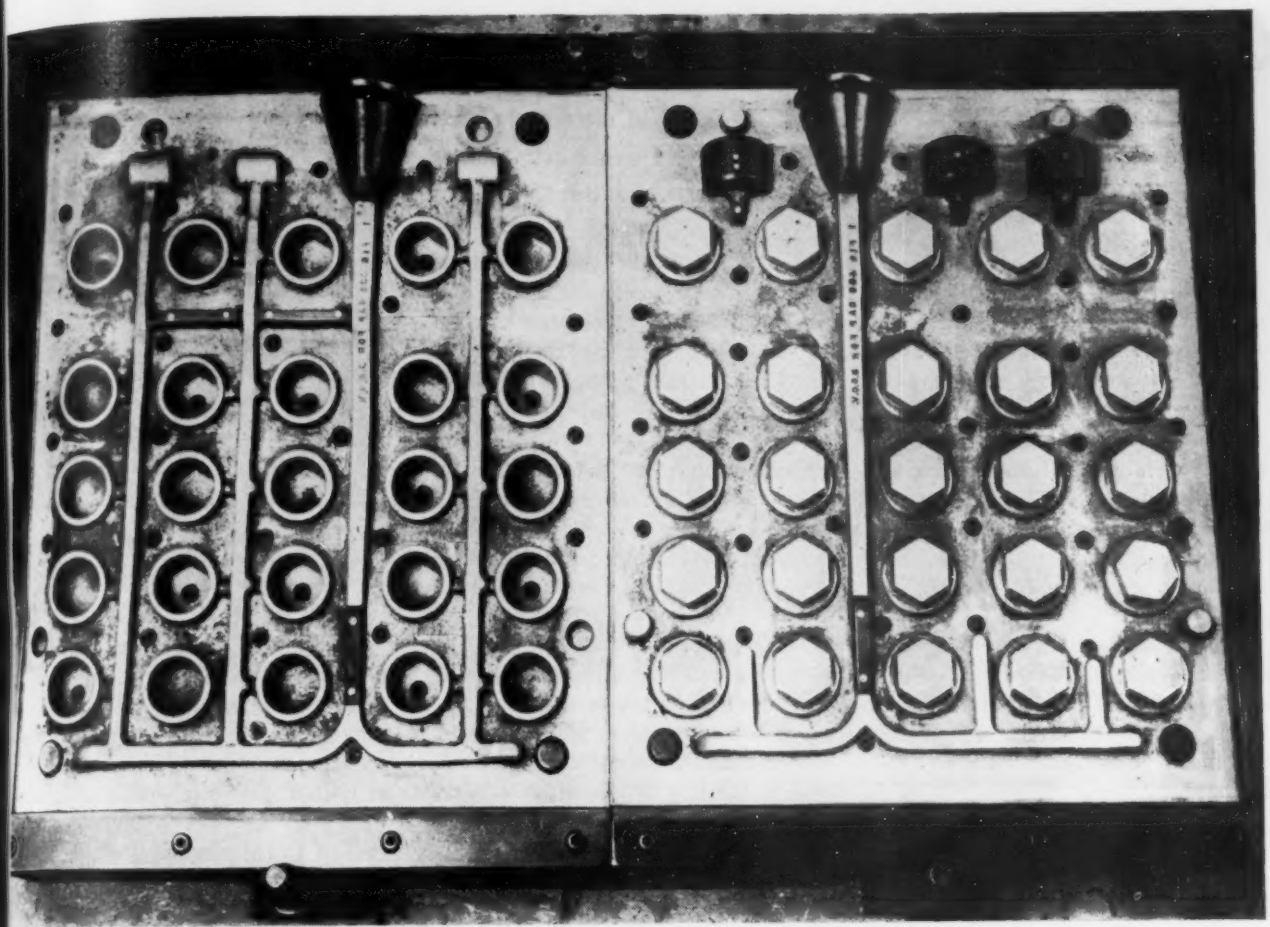
Design allowances can be shaved to provide a greater piece yield per mold. This high degree of accuracy is made possible by the method of mold making—bonding a thin layer of sand with phenolic resins. Porosity of these molds is said to re-



HALVES of mold are joined by adhesive under pressure in this machine. Can close more than 240 per hour.



CONTINUOUS belt pouring machine, where casting is done, travels at 6 fpm on monorail conveyor. Boxes hold molds.



PATTERN PLATES are 16 x 28-in. and can be used to make both halves of a 14 x 16-in. shell mold. Design allowances may be cut because of greater accuracy of process. Note minimum of gates and risers on pattern.

duce the number of reject castings. A further saving of casting metal is made possible by the fewer gates and risers needed with shell molding.

Costs of cleaning a shell-molded casting are substantially lower and the castings have much smoother surface finishes.

Can Store Molds

Not so obvious, but still a definite advantage in shell molding is the light weight of the molds. A green sand cope and drag weighs up to 20 times as much as a comparable-sized shell mold. It's claimed the heaviest weight a worker must lift in this automated foundry is less than 10 lb—eliminating many of the hazards of the green sand foundry.

Flexibility to an almost unheard-of degree is provided by the fact that shell molds can be stored almost indefinitely without warping or losing their accuracy. This is attributed to the dimensional stability of the Bakelite phenolic resins used.

Shell molds can be made faster than they are cast and stored in convenient racks until they're needed. In a green sand foundry the operations must be continuous because the heavy molds cannot be stored.

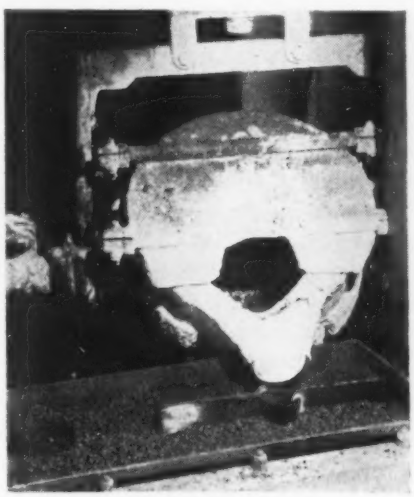
Cleaner foundry and better working conditions are also the result of the shell molding process.

Need Less Labor

Storage space and machinery needed to handle large volumes of foundry sand are eliminated. Less floor space is required and more castings can be produced in the mechanized foundry using the new process.

Labor needs are not as high and degree of skill required is lower with the automatic mold-making machine. Also the better working conditions are more favorable to the maintenance of a steady labor supply.

Ever since the government brought back the story of the Croning process from Germany, industry has watched, sampled and tested this production method. Most foundries have been slow to invest the money needed to switch. But the new era is definitely arriving.



POURING a shell mold. Mold is placed in steel box, reinforced with shot.

GM: Puts Billion In Prosperity Pot

Plans expansion to meet "normal growth" of market in next 2 years . . . Sloan ups ante to $1.5 billion in 3 years . . . Curtice raps pessimists as "uninformed"—By *R. D. Raddant.*

General Motors President Harlow H. Curtice tossed a billion dollars into the nation's economy last week, at the same time generated many times that much in terms of optimism.

While that commodity can't be calculated in dollars and cents, an announcement of a $1 billion capital improvement program coming at a critical point in the economic cycle has a way of compounding interest.

The billion in confidence that GM expressed means in itself that much assurance to its related industries, its workers, suppliers, potential customers and even to its competition.

He's Not Pessimistic

What it will mean to GM alone, Mr. Curtice roughly estimates as a 20 pct increase in production capacity by the time the billion is spent 2 years from now. Board Chairman Alfred P. Sloan predicted the program would actually run $1½ billion and extend 3 years before the program is completed.

Mr. Curtice outlined this program before an audience of leading industrialists as he kicked off GM's annual Motorama which opened last week at the Waldorf-Astoria in New York. Against this background of a complete line of GM products, plush dream cars, the first gas turbine powered car, engineering exhibits and a musical show, Mr. Curtice gave what might be called his personal annual report.

He was winding up his first year in the top job of the biggest auto producer and he did it without a word of pessimism. Later at a press conference he detailed other parts of the GM program.

Aims at 48 Pct

He pointed out that the expansion program is designed to "assure General Motors adequate capacity to enable us to keep pace with the normal growth of the market as we appraise it for the future."

He estimated a domestic market of 6,300,000 passenger cars and trucks with unit production in U. S. and Canada of 7 million. He predicted for business in general a gross national product about equal to the $365 billion estimated for 1953.

GM's sights have been set on 48 pct of the total car market, a goal Mr. Curtice set a year ago. In 1953 GM picked off only 46 pct, but it should be remembered that the Detroit Transmission fire last August virtually halted production of Hydra-Matic users Cadillac, Oldsmobile and Pontiac, for several weeks.

Job Picture Stabilizing

He hit directly at critics who have charged the auto industry is injuring the economy by over-production. He described business pessimists as "uninformed," added that some "may be developing a political issue."

On the controversial guaranteed annual wage, he pointed out that moving up new model introductions

"Just how long were you with the Atomic Energy Commission?"

HARLOW CURTICE: "Assure General Motors adequate capacity . . . to keep pace with the normal growth of the market."

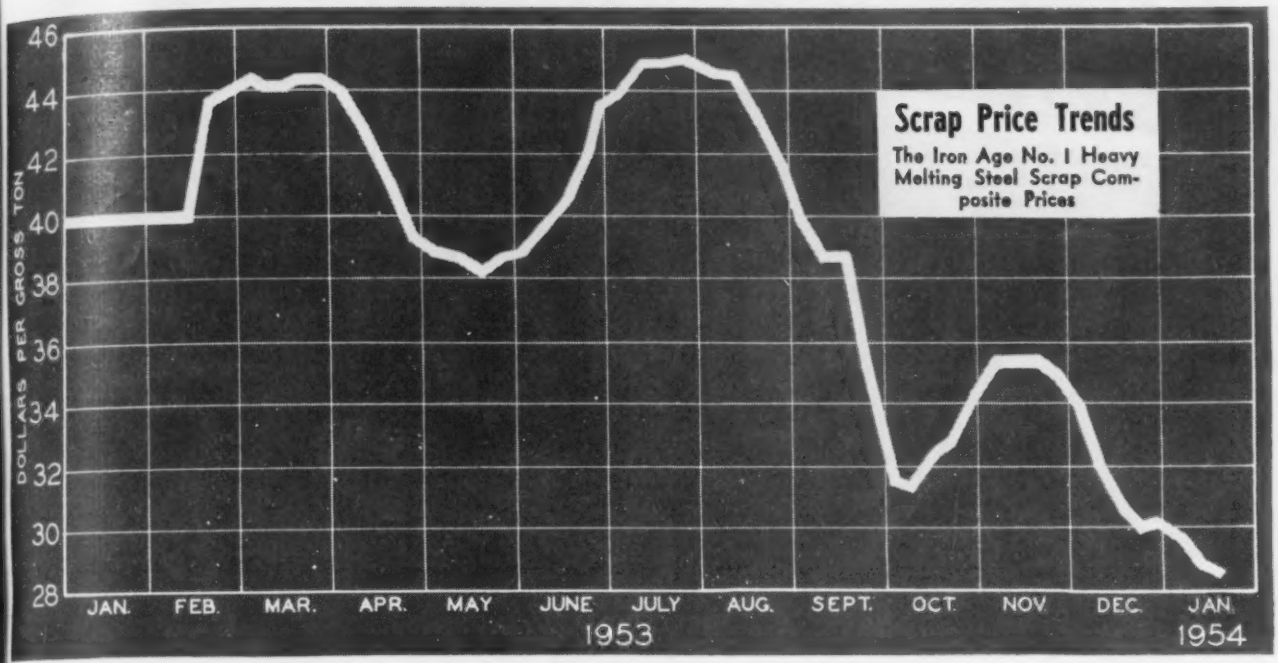
to fall, cutting model changeover downtime, other factors are contributing to a more stabilized employment picture. A prepared statement on this point, in which he anticipated the reporter's question, indicated the importance he attached to this issue.

He pointed out that under unemployment compensation programs currently in force, employers have paid more than $18 billion into state unemployment compensation funds. GM itself has contributed more than $240 million.

Has Confidence in Future

Reviewing the new model program, he pointed out that GM spent $350 million for tooling in jigs, dies, fixtures and special tools for its 1954 cars. He pointed out that the new $1 billion program is in addition to $2 billion previously spent since the end of World War II. It will give GM a total capital expansion within a decade of $3 billion, which does not include annual tooling expenditures.

"The fact that we are embarking on an unprecedented expansion program at this time is evidence that we have confidence both in the immediate future and in the long-term growth of the market for our product," he concluded. "This program is a measure of our faith in our country. It will enable General Motors to continue to make its full contribution to a strong and expanding national economy."



SCRAP: Gloom Shrouds Meeting

Dealers, brokers despondent at scrap meeting . . . Hit high freight rates, low prices . . . Eastern dealers pay more freight to Pittsburgh than to Japan—*By W. V. Packard.*

Last week was a time for taking stock in the scrap industry. And the trade's embattled dealers standing in the shadow of a depressed market saw little to cheer them.

Occasion was the 26th annual convention of the Institute of Scrap Iron & Steel. Meetings were held in Washington, Jan. 17 to 19.

A few of the braver souls avowed that better times were coming for those who could survive the awful present. But a good many dealers and brokers were frankly despondent. There was even some talk that the government should help stabilize the industry with some form of stockpiling program, though this was a minority opinion, born of desperation.

What They Agree On

Bulk of the industry's 1350 brokers and dealers felt that they would somehow survive the industrial calm presently paralyzing the industry, but made no effort to conceal their feeling that problems facing them were more critical than any they had faced for a long time.

Although there are many facets to the industry's problems, there was general agreement that:

(1) Supply has far outstripped demand. Consumers and suppliers alike are up to their ears in scrap, with little likelihood of any big change in the market soon.

(2) Freight rates are a more critical factor than ever before, particularly for dealers in remote areas.

(3) Exports can be a lifesaver to some in the trade—especially those located in coastal areas distant from large consuming centers. But it is doubtful that exports can siphon off more than a small part of current excesses.

(4) Heavy expenditures for mechanized handling and processing equipment have helped alleviate the problem of rising wage rates. But larger invested capital, with high fixed charges, makes cyclical declines harder to withstand.

The double-barreled problem of high freight rates and falling prices was highlighted by retiring ISIS president Ralph E. Ablon: "New England dealers can load and ship their scrap to European consumers for approximately $3 per ton less than their freight to Pittsburgh and to Japan for $4 more than freight to Pittsburgh—and historically Pittsburgh has been the major consumer of New England scrap.

More to Pittsburgh than Japan

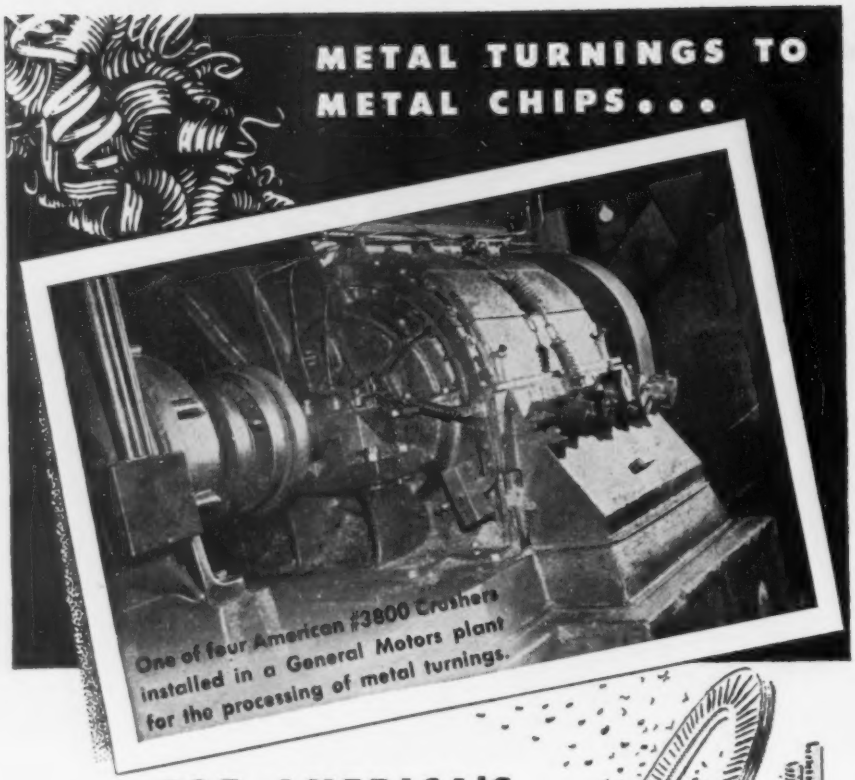
"Dealers along the South Atlantic Coast can ship to Europe for $8 per ton less than to Pittsburgh and to Japan for $2 less than to Pittsburgh."

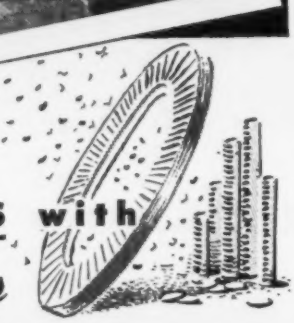
Meanwhile, expectation of further relaxation of export regulations received a setback when Commerce Dept. announced that present open-end policy would carry through first quarter.

More than 218,000 short tons of ferrous scrap were licensed for export during the fourth quarter of 1953. However, only 22,000 tons actually had been shipped by the end of the year.

Total export licensing of ferrous scrap during 1953 added up to 514,700 short tons, of which 244,800 tons had been exported during the first 11 months.

Turn Page


METAL TURNINGS TO
METAL CHIPS . . .
One of four American #3800 Crushers installed in a General Motors plant for the processing of metal turnings.



. . . FOR AMERICA'S BLUE CHIP COMPANIES with

American METAL TURNINGS Crushers

WHY an AMERICAN installation makes Dollars and Sense:

These cost-conscious companies have long-since learned that American-crushed metal turnings quickly recover an initial American Crusher investment in these important ways:

$3 to $4 Extra Profit Per Ton: With higher scrap values for metal chips over ordinary machine shop turnings, a daily crushing capacity of only 2 tons will produce $1200.00 per year in extra profits.

Up to 80% Less Space: Reduction to metal chips solves many expensive handling and storage problems, and allows easy briquetting.

30-50 Gallons Per Ton Cutting-Oil Recovery: An important reclamation that adds new profits with an American Crusher installation.

Write for Bulletin
"METAL TURNINGS CRUSHERS"

PROMINENT AMERICAN CRUSHER USERS

The users of American Metal Turnings Crushers read like a "Who's Who" of American Industry. Included are such names as:

GENERAL MOTORS • FORD TIMKEN • ALLIS-CHALMERS GENERAL ELECTRIC • BUDD WHEEL • CHRYSLER.

American PULVERIZER COMPANY
Originators and Manufacturers of Ring Crushers and Pulverizers

1439 MACKLIND AVE.
ST. LOUIS 10, MO.

—Raw Materials—

Ed Barringer, executive vice-president, declared that pig iron is scrap's competitor. That's why consumption of an estimated 32 million gross tons last year did not quite top the previous record of 1951—even though steel production was substantially higher. He urged conservation of ore resources by greater use of scrap.

Pig Battles Scrap

In the 17 years that Bureau of Mines has compiled detailed statistics the average charge into all types of furnaces has been 23.9 pct purchased scrap, 27.6 pct home scrap, and 48.5 pct pig iron. Maintenance of this ratio would insure sufficient scrap demand to keep collection and preparation machinery going, Mr. Barringer asserted.

David C. Holub, Holub Iron & Steel Co., Akron, Ohio, is the newly elected president of ISIS.

Other new officers are: Leonard H. Krieger, Southwest Steel Corp., Pittsburgh, first vice president; Myron L. Chase, Luntz Iron & Steel Co., Canton, O., second vice-president; Emmanuel J. Moskowitz, Schiavone Bonomo Corp., Jersey City, secretary, and Milton K. Mahler, Morrow Steel Co., Detroit, treasurer.

Charge Luria Bros. with Monopoly

Charges that Luria Brothers & Co., Inc., of Philadelphia, has engaged in trade practices that "tend to create a monopoly" in the buying and selling of iron and steel scrap are listed in a complaint issued by the Federal Trade Commission on Jan. 25.

In addition, the FTC charges 10 iron and steel producers with "unfair" cooperation with Luria in the buying and selling of scrap.

All respondents have been allowed 20 days in which to file answers to the FTC complaint. First hearing has been set for Apr. 5 in Philadelphia.

A Luria Brothers spokesman said Monday in part:

"The complaint makes charges which will not be supported by the facts and shows a complete lack of knowledge and disregard of the nature of this business. . . ."

ORE: First From Cerro Bolivar Here

Delivery to Fairless Works of first Cerro Bolivar iron ore climaxes years, millions in development . . . First shipment 6000 tons . . . Ship 3 million this year—By G. G. Carr.

Culmination of years of cooperative effort between U. S. Steel's Orinoco Mining Co. and the government of Venezuela came last week when USS Chairman Benjamin F. Fairless gave the go-ahead to Craneman Frank Rossi at the ore dock of the corporation's $400 million-plus Fairless Works.

As corporation executives and representatives of the American and Venezuelan governments watched, a 15-ton clamshell bucket transferred the first of the 6000 tons of iron ore from the hold of the Swedish freighter *SS Tosca* to a specially decorated ore car. This first shipment of Cerro Bolivar ore had been loaded Jan. 8 at Puerto Ordaz, Venezuela.

Transportation Was Headache

Orinoco Mining Co. officials have said they hope to ship 3 million tons of iron ore this year and 5 million tons in 1955. Total ore production by all U. S. Steel holdings in 1953 was rated at 59 million tons.

Discovery of Cerro Bolivar's ore deposit in 1947 came as part of U. S. Steel's worldwide search for new iron ore sources. Exploration by U. S. Steel in Venezuela started in 1945 under the direction of Mack C. Lake. Mr. Lake was later made the first president of Orinoco Mining Co.

Ore of Good Quality

In order to provide transportation facilities from Cerro Bolivar to the sea, U. S. Steel not only constructed the 91-mile railroad from the mine to Puerto Ordaz, but has completed extensive dredging of the Orinoco and Macareo Rivers to provide a 154-mile channel to the sea for ocean-going vessels.

Official figures on the cost of bringing the ore to this country aren't available, but unofficial dockside talk placed the amount already spent in developing the vast deposit at well above $150 million to date.

Proven deposits on U. S. Steel holdings at Cerro Bolivar run into hundreds of millions of tons. Ore is of very good quality, mostly hematites, running 62 to as much as 69 pct Fe. Last week's shipment was rather finer than normal, and iron content ran about 56 pct with alumina 1.5 pct and very low silica.

Share Deepening Costs

Disproportionate alumina-silica balance will probably cause some operating adjustments at Fairless Works blast furnaces to find the most efficient mixing method. Most ore used in this country yields slag running around 12 pct alumina, but the Venezuelan material may run as high as 20 pct.

Since the Delaware River channel above Philadelphia cannot accommodate deep draft ships, the *Tosca* could be loaded to draw only 21 ft. But Congress is expected to act on various proposals to deepen the channel early this year. Latest Corps of Engineers report suggests that costs be shared between the Federal Government and the affected states, with neighboring industries possibly contributing. (THE IRON AGE, Nov. 5, 1953, p. 110).

Benefits Both

At a luncheon following the ceremonies, Mr. Fairless hailed the spirit of friendship and cooperation displayed by the Venezuelan government and people throughout the development. In reply, Dr. Cesar Gonzalez, Venezuelan Ambassador to both the U. S. and the UN, stressed the economic benefits of the project to his country. He pointed out that the development showed how progressive governments and foreign capital could work harmoniously together for the benefit of all concerned.

AFTER many years, expenditure of millions, U. S. Steel last week received first shipment of Cerro Bolivar ore. Three million tons will be shipped this year.

1954-55 BUDGET AT A GLANCE

Budget Breakdown

(Millions of Dollars)

Item	Amount	Increase or Decrease
Estimated Spending	$65,600	—$5,300
New Money Requests	56,300	— 4,400
Estimated Deficit	2,900	— 400

New Money-Selected Categories

(Millions of Dollars)

Category	Amount	Increase or Decrease
Defense Dept.	$31,000	—$4,500
Atomic Energy	1,400	+ 350
Foreign Military Aid	2,500	— 1,300

No Bleeding From Planned Budget Cut

- Proposed $5.3 billion cutback in government spending for fiscal '55 will not shake economy. May cause trouble for a few businesses.
- New spending pattern emerges. Defense outlay will remain around $35 billion for next 3 years while other expenditures are cut.

A $5.3 billion cutback in government spending, as proposed in the new federal budget, won't have much effect on the domestic economy as a whole, although it may be rough for a few individual segments.

Emerging from 1182 printed pages of budget figures is the indication that a pattern has been established for defense spending: It is apparent that while further reductions may be in store for other government operations, defense spending is leveling off at around $35 billion—where it will remain for the next 3 years or more.

Cut Housekeeping Expenses

Procurement and spending for aircraft, ships, and military public works will continue next year at about the same levels as in 1954.

More emphasis is to be placed on electronics and related developments—and also on guided missiles. Procurement rates will be somewhat above the 1954 rate.

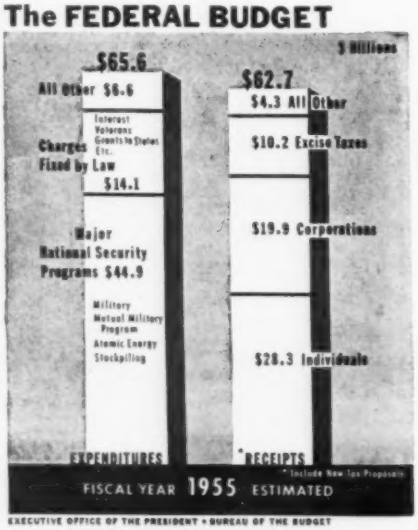
Reductions are to be expected in the housekeeping end, however, as well as in purchases of automotive vehicles, soft goods, and ammunition. Now that the shooting has stopped, inventories of these items are at levels which require little more than maintenance.

From an overall standpoint, President Eisenhower has reduced government requests for new funds from the current figure of $60.7 billion to $56.2 billion. Actual spending is to be slowed down from the present rate of $71 billion to $66 billion.

Won't Slug Industry

Brunt of the White House economy move will fall on the Defense Dept. Nearly all savings in the budget come from this source.

The FEDERAL BUDGET



As stated earlier (THE IRON AGE, Jan. 7, p. 303), new funds requested for the Defense Dept. are to be held to a $31 billion level, a reduction of $3.5 billion from 1954.

This won't have any serious impact on industry for two reasons:

(1) Major cancellations, stretchouts, and other procurement realignments reflecting this drop have already been made. New orders should now be firm.

(2) While the budget provides only $31 billion in new funds, the services will begin the new fiscal year next July 1 with a carry-over of $8 billion plus in unused or unobligated funds, making a total of $39 billion available.

Who Gets What

A top Defense Dept. official estimates that the spending rate from now on through June, 1955, will run at about $35 billion, perhaps a little more, which means defense fund carry-overs will continue.

As forecast by THE IRON AGE, defense agencies trimmed new money requests 15 pct below 1954 levels. This leaves some $14.5 billion available for major hard goods procurement, not including carry-over funds. Here's a thumbnail summary:

Air Force: Gets $11.2 billion of the defense budget, just about the same as last year. Lion's share

will go into aircraft. As of next June, Air Force will have roughly 21,000 planes and 115 wings — nearly all equipped. Close to $4.5 billion in new funds is asked for direct aircraft procurement, exclusive of contracts already placed and not counting the $2 billion carry-over still available. Emphasis will be on jets to increase our striking power in retaliation to an attack by the enemy.

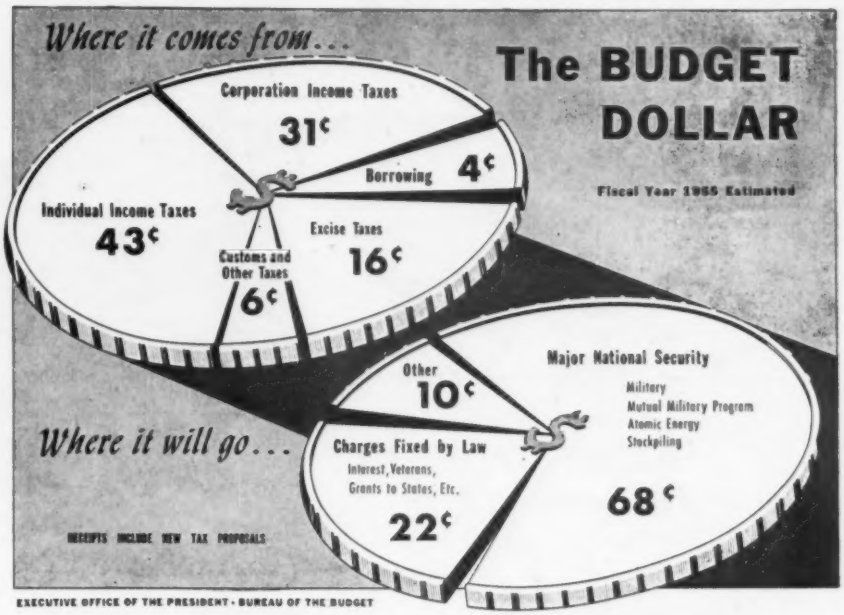
Army: Will take most of the defense budget cuts. It will get $8.2 billion to go on, considerably less than this year. There will be a reduction in strength of two divisions but anti-aircraft units will be increased along with weapons, including Nike missiles. There'll be more living off the shelf under the new budget.

Navy: Will get $9.9 billion, slightly more than last year. Idea is to continue shipbuilding near present levels although some may go into mothballs if the rate exceeds replacements needed for obsolescence. At the same time, Navy and Marine airpower will be increased, modernized. Navy now has 13,000 aircraft, 1124 active ships, including 407 warships. These will be reduced slightly in number as far as the active fleet is concerned.

Marines: Will lose 10,000 enlisted personnel but will retain present combat strength. As of June 1955, Marines will have 215,000 men, three combat divisions, and three air wings.

Airpower: Combined services now have a total active inventory of 33,000 aircraft, of which one-third are jets. Emphasis is to be placed on stepping up the active inventory to 40,000 craft over the next 3 years—aiming at 50 pct jetpower.

At that time, Air Force expected to have 137 wings, fully equipped, of which 126 would be combat wings; Navy is aiming at 16 carrier groups by the same target date as well as 15 anti-submarine squadrons. Marines will maintain three wings.



Expect Depreciation Tax Break

◆ **Fast amortization of plant, other capital goods purchases industry's biggest break in new tax proposals. Enactment by Congress expected.**

◆ **Battle expected on President's recommendation that corporation tax be left at 52 pct. Some congressmen favor compromise at 50 pct.**

Fast amortization, the most important tax "break" for industry presented in President Eisenhower's list of 25 hold-the-line revenue recommendations, is winning enthusiastic support among congressional tax-writers. Its chances for enactment into law this year are excellent.

Elsewhere on the tax front, Mr. Eisenhower recommends that Congress maintain a "hands off" policy with respect to the existing rates on corporation income, individual income, and excise taxes. Because this is an election year, however, Congress may not go along with the White House recommendations on this phase of the tax policy.

Congress currently favors permitting the scheduled automatic reduction on Apr. 1 of the existing rates on automotive products, gasoline, sporting goods, liquor, and tobacco. The gasoline tax, however, may prove to be the exception.

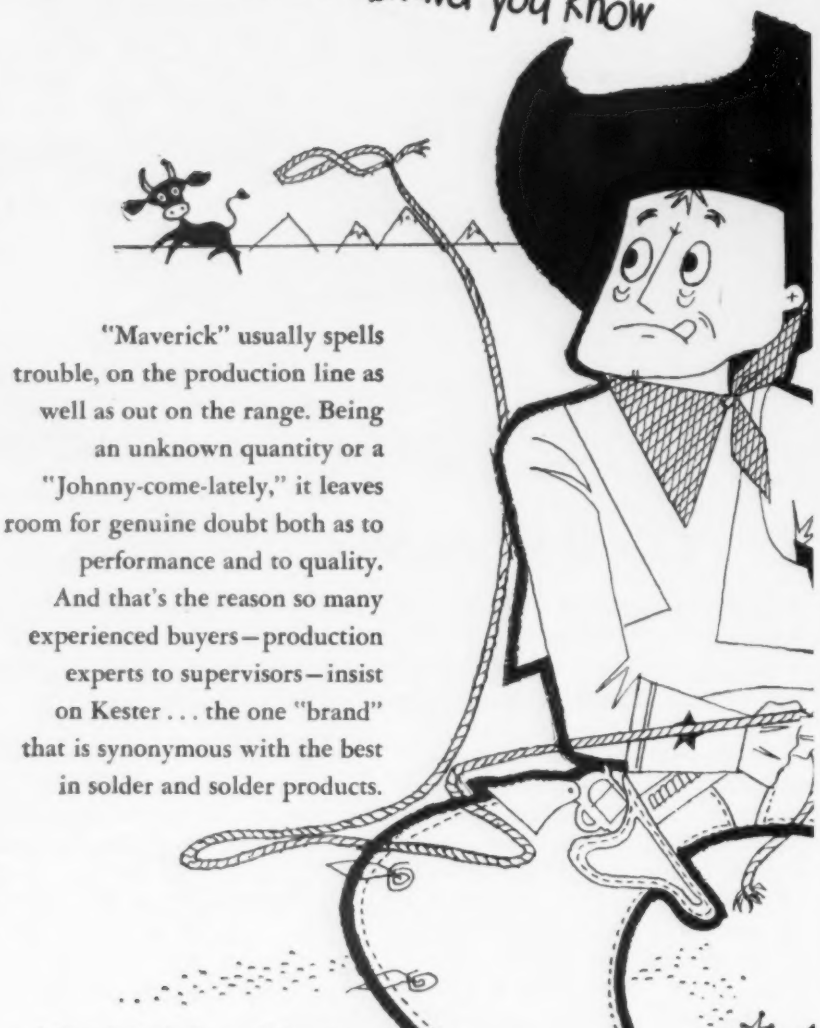
As to the current rate (52 pct) on corporate income, some members of the tax-writing committees favor dropping the rate to a compromise 50 pct, instead of permitting the automatic drop to 47 pct.

Prospect for further reduction of individual income rates will not become clear for at least several more weeks. The White House takes the position that the recent automatic drop (average 10 pct) in individual income tax rates is all that can be afforded this year. But a number of influential majority members believe that a "bonus" cut of 5 pct should be written into this year's tax bill.

On fast amortization, Mr. Eisenhower recommends that business be allowed "more freedom" in using straight-line depreciation and in selecting other methods. Leaving the specific provisions up to Congress, he suggests that larger depreciation charges be allowed in the early years of the life of property by using the declining-balance method of depreciation at rates double those permitted under the straight-line method.

He also recommends that Congress accept other methods which give larger depreciation in early years, so long as they do not produce deductions which exceed those available under the declining-balance method of calculation.

let 'er go, skipalong,
stick with the "K" brand you know



"Maverick" usually spells trouble, on the production line as well as out on the range. Being an unknown quantity or a "Johnny-come-lately," it leaves room for genuine doubt both as to performance and to quality. And that's the reason so many experienced buyers—production experts to supervisors—insist on Kester . . . the one "brand" that is synonymous with the best in solder and solder products.

Insist on Kester for the exact job-engineered Solder you require; 8 major Fluxes in Core Solder, available in 5 core openings. Also . . . Kester Solid Wire and Bar Solder, Kester "Solderforms" and Kester Fluxes.

KESTER

SOLDER COMPANY

4215 WRIGHTWOOD AVENUE • CHICAGO 39, ILLINOIS
NEWARK 5, NEW JERSEY • BRANTFORD, CANADA

STEEL: British Hi

Supply and demand virtually in balance . . . Sheet, plate still tight . . . Cut import tonnage.

British steelmen, aiming at their production target of 19.6 million net tons for 1953, set a new record of 19,722,000 tons for the year. They beat 1952 by about 9 pct. Pig iron output was 12,516,000 tons, compared with 12,015,360 tons in the previous year, according to British Iron and Steel Federation figures.

For a time it seemed possible to produce even more steel but output fell short of expectations in the summer and early fall. Yet, the year's gain was the largest since the war—excepting 1948 when production shot up after the fuel crisis of 1947.

Imports Were Cut

While setting this new record, British steelmakers also boosted pig iron and scrap stocks by 336,000 tons. These were heavily drawn upon to sustain production in 1951 and, while they aren't up to the abnormally high 1950 level, they are now fully adequate to support a much higher production rate. Ore stocks now stand at record proportions.

Because of higher 1953 production Britain was able to substantially cut its imports of ingots and semi-finished steel. These totaled 1,232,000 ingot tons in 1953 as compared to the abnormally high 2,038,400 tons in '52.

Sheet, Plate Tight

Consumers and merchants added a million ingot tons of steel to their stocks in the 18 months up to the middle of 1953—equivalent to more than 40 pct of total U. K. imports.

Except for sheet and plate, demand and supply have virtually come into balance. Plate tightness results from intensified railway car and shipbuilding programs. This situation is expected to clear itself up without any further additions to plate capacity.

New Output Record

Year's output of plates is believed to have reached 2,800,000 tons, 10 pct over 1952. Supply was swelled by 95,000 tons of imported plates, an increase of 15,000 tons. Exports totaled 252,000 tons against 268,000 tons in 1952 resulting in a net gain of about 12 pct in supply.

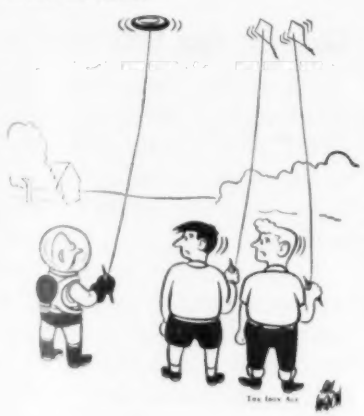
By early 1952 new sheet capacity could pretty well meet home demand. Thus imports faded to practically nothing. Declining home demand for sheets early in 1953 expanded sheet exports. They rose from 67,000 tons in the first quarter to 100,000 tons in each of the next two.

Don't Want Overcapacity

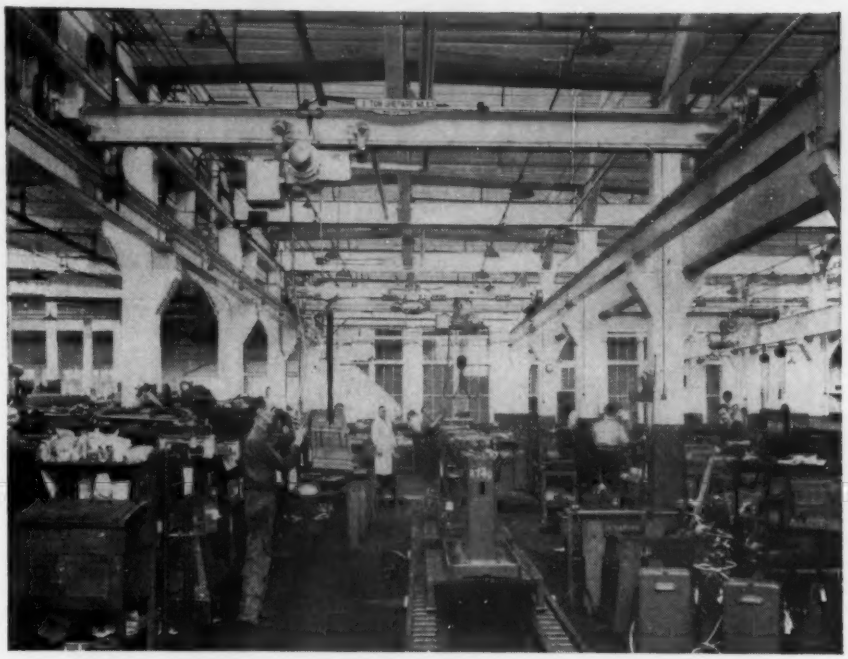
But by summer, relaxation of import restrictions in Australia and New Zealand plus rising home demand caused a tightening. New capacity should boost supplies to meet this in 1954.

British steelmen feel the best way to handle temporary peaks in demand for particular products is not through provision of excess mill capacity which at other times would be idle. Nor should it be handled by violent fluctuations in exports with the resulting disturbance of foreign sales.

Instead they vary their import program. For this reason imports of half a million ingot tons annually during normal times have been envisaged since 1935. It was estimated in 1948 that demand would hit 20,160,000 tons annually by the mid 1950's. Home steel production in fourth quarter '53 was already at an annual rate of 20,440,000 tons.



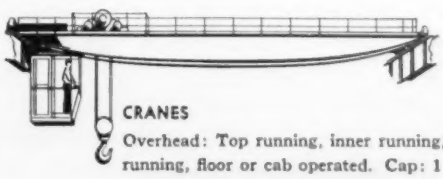
Handle it where there's SPACE to spare



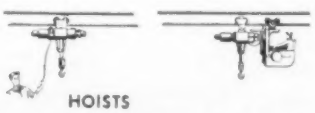
SHEPARD NILES Crane

Want more room for production or storage? Then move your handling overhead! Install a Shepard Niles Crane and speed your heaviest loads safely and economically by the most direct route.

More floor space is only one advantage which through-the-air handling affords! Let a Shepard Niles representative explain the many other benefits it offers. He'll recommend a crane that is specifically engineered to your plant's needs. And remember: all component parts are designed and built by Shepard Niles especially for crane operation—your guarantee of long, dependable service with a minimum of maintenance.



CRANES
Overhead: Top running, inner running, under running, floor or cab operated. Cap: 1 to 450 tons.



HOISTS
Operated from cab, floor or pulpit. Cap: 1 to 20 tons.

SHEPARD NILES
CRANE AND HOIST CORPORATION

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( ) Please send me your latest Crane Bulletin.
( ) Please have a representative call.

NAME _____ TITLE _____
COMPANY _____
STREET _____
CITY _____ STATE _____

—Transportation—

JOURNEY OVER, a De Long barge is jacked on its pilings to pier height and becomes a dock. Army may use it in amphibious operations.

Big Steel Teaches the Army

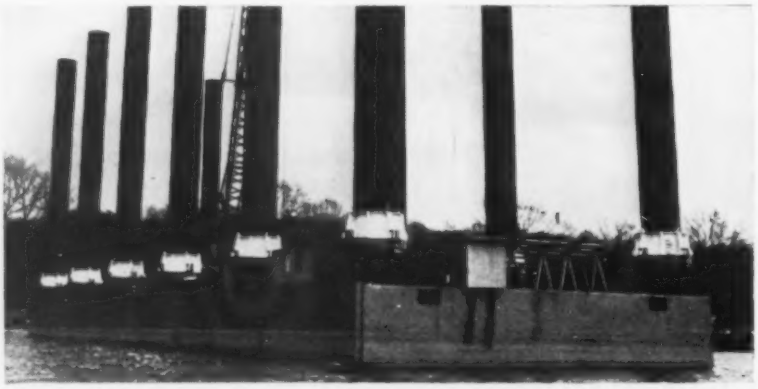
Experience of U. S. Steel Corp. with the De Long floating, walking dock-barge may result in the speed-up of military deck-to-shore supply movements in amphibious operations.

In use, a De Long barge is floated to a job site alongside a pier. Its legs or piles are lowered into the water until they rest firmly on the bottom. Air jacks are used to raise the barge out of the water to pier height. The barge then can be used as a dock for loading and unloading supplies.

U. S. Steel first employed these mobile docks in its Venezuelan ore shipping operations in 1952. Army engineers are now giving the De Long dock-barge intensive tests at Fort Belvoir, Va., to find out if they can be used to speed amphibious operations.

Normal construction time for pier might range up to 6 months, but with the De Long units a dock could be put in place within 3 days. There is also a possibility that the dock barges may find application in off-shore oil drilling operations.

Unit being tested by Army engineers measures 250 x 60 x 10 ft and weighs 800 tons. A small group of Army personnel has been training in use of the De Long barges since December.



MOBILE dock-barges can be towed thousands of miles to jobsite. Black tubes are dock barge's pilings used to secure and raise the dock.

—Purchasing—

Warning:

FBI seeks fake steel salesman, asks industry's aid.

The FBI is flashing the warning signal to metalworkers to beware of buying "hot" steel. An intensive hunt is on for a so-called steel salesman who gets his steel free and sells it for a profit. His only operating expense is the cost of the time he puts into his confidence game.

The FBI claims Albert Fred Romanuik, 32, of Detroit, Mich., has for the past 2 years been defrauding steel distributors by selling them fraudulently acquired steel. His technique is said to consist of ordering from steel companies about 20,000 tons of steel, usually cold-rolled items, by claiming to be a representative of a nationally known manufacturing company.

When the steel arrives at a trucking terminal, he diverts the shipment to a buyer he has previously contacted under an assumed name. A warrant for his arrest was issued by a U. S. Commissioner at Milwaukee on Nov. 4, 1953, but his operations have covered good parts of the East and Midwest.

Romanuik knows the steel business and its terms, has friends and contacts unaware of his activities in the trade. He is said to be a neat dresser who creates a good impression and prosperous appearance. He has used a number of aliases, almost all involving the first name of Al. He is described as white, 6 ft 3 in. tall, 180 lb.

Open-End Mag, Moly Export Quota

Exports of magnesium metal and molybdenum have been open-ended until further notice. But while no quantitative limit is imposed, national security rules will govern.

Supplies are now improved to the extent that the quantity limits can be lifted without danger to the domestic economy, the U. S. Bureau of Foreign Commerce says.

DIES: Autos Give Push for Big Year

Midwest diemakers brace for top business column . . . Auto changes tow industry out of decline . . . What cars will remodel bodies . . . Large dies get demand first—By *R. D. Raddant*

Midwestern die manufacturers, particularly those tied in with the auto industry, are bracing for one of their biggest years in terms of civilian programs.

This extremely optimistic statement is made in the face of several past months that at best could be termed spotty.

"We bid for more jobs between Jan. 1 and Jan. 15 than we did the entire 2 previous months," declared one of Detroit's established automotive diemakers. "Though 1954 won't be as big as 1953 because of cancellations of military programs, it should be nearly as good."

New Car Bodies

The new orders he refers to are related specifically to some of the most extensive automotive body changes in years that are coming up in 1955 lines. They include complete new bodies for all of Ford's three going divisions as well as a possible program for the embryonic Continental, a wholesale revision of General Motors' so-called A body (Pontiac and Chevrolet); and new programs for Chrysler divisions.

At the end of 1953, many die manufacturers were not doing too well. It might have been a seasonal condition between automotive model changes, but in recent plush years, fat military orders gave diemakers more work than they could handle. This made the decline seem serious by comparison.

Had Less Work

Diemakers were laid off, overtime was cut, and premium wage offers ceased to be the rule. One die authority estimated that at the close of 1953 die shops were operating fewer hours than at any time since 1950.

But at mid-January, makers of large dies were again loaded. Manufacturers of smaller dies were still suffering from slim pickings, but the number of jobs on which they were asked to bid assured them of lucrative programs in the months ahead.

Orders for the big dies, fenders, tops, body panels, rear decks, hoods and other large parts are logically placed months ahead of smaller die jobs for moldings, trim, small panels and other smaller parts. For this reason, the industry could report feast and famine at the same time, depending on which segment was contacted.

In addition, many die manufacturers tend to stick with the same auto company or companies. Some are asked to bid, for example, on Chrysler or independent programs, but not Ford or General Motors—or vice versa.

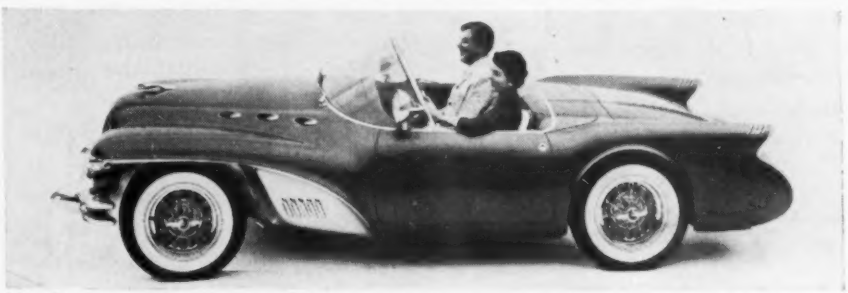
It is difficult to estimate die programs in terms of dollars. Automakers unfailingly refuse to disclose tooling costs in lump sums, let alone breaking them down to die programs.

A Cadillac executive recently told a meeting of suppliers that retooling for the completely new 1954 Cadillac body ran to about $33 million. The new Chevrolet and Pontiac body changes should run much higher because of the much greater production volume of these lower priced GM divisions.

Ford should bring out new bodies for all three divisions since current body styles are in their third year. This will add many more millions of dollars in die programs. Though it's yet too early to determine the extent of the Chrysler change, it will rival the other two of the Big Three in expense if present evidence is substantiated.

Diemakers express some concern over the rush nature of their programs in evaluating the business prospect for 1954. Both Ford and GM are pushing their programs with all the pressure they can muster toward a fall model introduction.

"It looks like a bigger year than last year, but we also got an earlier start," one manufacturer cautioned. Incidentally, he supplies GM and Ford. In contrast, Chrysler suppliers warn that they are getting a late start because of indecision or a last minute change of plans at Chrysler's top level.



EXPERIMENTAL CARS like Buick's Wildcat II give diemakers idea of future designs.

Generally, the independents have not yet placed many orders or asked for significant bids on die programs. The recent Nash-Hudson merger came too late to have much effect on 1955 stylings. Here, face liftings appear to be in order. While these can run into sizable figures, they can't compare with a complete model change.

One flaw in the picture that die manufacturers will have to face is labor supply. In late 1953 skilled labor for the first time since 1950 began to ease as tool and die orders tapered off. When the big orders come in, the labor market will tighten correspondingly and tool and die shops will return to competing for labor.

On the other hand, tool and die shops have generally been able to get their machinery and equipment in top condition and no outstanding machinery shortage plagues them at the moment.

Spending:

More businesslike handling of defense funds urged.

Congress will keep a closer watch on the way the military handles its money.

At the urging of a Senate Armed Services subcommittee, Defense Secretary Charles E. Wilson and the civilian chiefs of the three major services are to report quarterly, beginning Mar. 31, on their use of a 1949 law designed to produce businesslike fiscal operations in the armed forces.

Subcommittee Chairman Ralph E. Flanders, R., Vt., is dissatisfied with steps taken thus far to implement the law. If its terms are carefully followed, he says, "the potential elimination of avoidable waste is almost unimaginable."

Want Results

The subcommittee recently commended Mr. Wilson and Army Secretary Robert T. Stevens for naming groups of businessmen to provide advice on accounting practices. In addition one advisory committee has asked Mr. Stevens to create the post of Assistant Army Secretary for Financial Management.

Secretary Wilson endorses this suggestion, saying he believes each of the services could use an assistant secretary to guide money policies.

But the Flanders subcommittee still wants to see concrete results. It recommends that Secretary Wilson:

1. Consider the "grave problem" of the scarcity of qualified accountants and fiscal managers—particularly civilians—in the armed forces.

2. Study the feasibility of appointing civilians as comptrollers of the military departments, responsible solely to the civilian department heads.

3. Report regularly to Congress and the President on what combat supplies and other materials are being bought, are now on hand, or are under contract.

Lanphier Added to Defense Staff

Responsibility for planning and measuring U. S. industrial capabilities for the Defense Dept. is the concern of Robert C. Lanphier, Jr., of Springfield, Ill., new director of planning and review in the office of Assistant Defense Secretary Charles S. Thomas.

The appointee has held executive posts in the electrical industry in this country and England since 1927. In 1939 he became vice-president for manufacturing at the Springfield plant of Sangamo Electric Co., was later appointed to board of Central Illinois Light Co.

Contracts Reported Last Week

Including description, quantity, dollar values, contractor and address. Italics indicate small business representatives.

Power unit for P2V-5 aircraft, 252 ea, $61,690, Minneapolis-Honeywell Regulator Co., Minneapolis, Minn., *S. F. Keating.*

Canopy assy, 13 ea, $85,934, McDonnell Aircraft Corp., St. Louis, Missouri, *H. L. Giesler.*

Dampers, $109,976, Delco Products Div. of General Motors Corp., Dayton, Ohio, *F. J. O'Donnell.*

Maintenance parts used on strut assys, Var, $56,594, The Cleveland Pneumatic Tool Co., Cleveland, Ohio.

Actuator, 203 ea, $263,186, Foote Bros. Gear and Machine Corp., Chicago, Illinois.

Items & spare parts for valves, Var, $116,665, Airesearch Mfg. Co., Los Angeles, Calif.

Items & spare parts for oil coolers, 277 ea, $96,788, Clifford Mfg. Co., Waltham, Mass.

Screwjacks, actuator, spares, Var, $82,544, Eastman Machine Co., Buffalo, N. Y.

Actuators for use on VF-1 aircraft, Var, $71,562, Airborne Accessories Corp., Hillside, N. J.

Oil cooler, 535 ea, $258,229, Airesearch Mfg. Co., Los Angeles, Calif.

Various assys, for use on HSD propellers, Var, $309,769, United Aircraft Corp., Windsor Locks, Conn.

Materials for use on J48-P6A and P-5 engines, Var, $71,910, United Aircraft Corp., East Hartford, Conn., *E. E. Champion.*

Spare parts for support of P&W engines, Var, $3,443,698, United Aircraft Corp., East Hartford, Conn., *E. E. Champion.*

Material for use on R4360-59 engines, Var, $145,276, United Aircraft Corp., East Hartford, Conn., *E. E. Champion.*

Material for use on R4360-59 engines, Var, $3,769,187, United Aircraft Corp., East Hartford, Conn., *E. E. Champion.*

Spare parts for support of J57-P-11 engines, Var, $1,533,597, United Aircraft Corp., East Hartford, Conn., *E. E. Champion.*

Items for use on mobile electric power plant, Var, $178,400, General Electric Co., East Hartford, Conn.

Boot deicer, plug and sleeve, Var, $299,038, The B. F. Goodrich Co., Akron, Ohio.

Spare parts used on P&W engines, Var, $532,685, United Aircraft Corp., East Hartford, Conn., *E. E. Champion.*

Spare parts used on P&W engines, Var, $134,173, United Aircraft Corp., Windsor Locks, Conn.

Material for use on P&W engines, Var, $173,812, United Aircraft Corp., East Hartford, Conn., *E. E. Champion.*

Indicators, Var, $216,528, Sperry Gyroscope Co., L. I., New York.

Crankshaft, shaft and materod assys, Var, $608,498, United Aircraft Corp., East Hartford, Conn., *E. E. Champion.*

Material for J48-P-5 engines, Var, $266,602, United Aircraft Corp., East Hartford, Conn., *E. E. Champion.*

Material for use on P&W J-48-P-5 engines, Var, $409,943, United Aircraft Corp., East Hartford, Conn., *E. E. Champion.*

Material for use on HSD propellers, Var, $519,219, United Aircraft Corp., Windsor Locks, Conn.

Material for P&W engines, var, $180,153, United Aircraft Corp., East Hartford Conn., *E. E. Champion.*

Kit, modification for conversion of carriage motor, 105 MM Howitzer, 425, $996,654, Bowen-McLaughlin-York, Inc., York, Penna.

Adapter, grenade, 1500, $83,850, Geo. K. Garrett Co., Inc., Philadelphia, Pa.

20 MM steel cartridge cases Mk 5, 4000000, $868,000, Thomas Industries, Inc., Fort Atkinson, Wisconsin.

Manufacture of 20 MM feed mechanisms, 4000, $3,448,153, DeLaval Separator Co., N. Y.

Nose and body assembly, 10666, $217,247, New Haven Clock & Watch Co., New Haven, N. Y.

Machine, horizontal, single spindle, 16, $66,880, Standard Knapp, Portland, Conn.

Cartridge ball, cal. .50 M, 16875000, $16,875,000, Remington Arms, Bridgeport, Conn.

Apparatus, decontaminating power-driven truck mtd, 255 ea, $652,737, John Bean Division Food Machinery & Chemical Corp., Lansing, Mich.

Rotary tables 10 foot diameter precision power driven, 2, $112,440, Giddings and Lewis Machine Tool Co., Fond Du Lac, Wisconsin.

Trucks, fork lift, gas, 10, $65,325, Gerlinger Carrier Co., Dallas, Oregon.

Trucks, fork lift gasoline, 41, $165,093, The Yale & Towne Mfg. Co., Phila., Pa.

Trucks, fork lift, gasoline, 16 $59,895, Clark Equipment Co., Buchanan, Mich.

Spare parts for materials handling equipment, 60578 ea, $313,193, Clark Equipment Co., Jackson, Mich.

Spare parts for materials handling equipment, 452 ea, $82,274, Clark Equipment Co., Jackson, Mich.

ATOMIC-POWERED submarine USS Nautilus hits water at last week's launching at Groton, Conn., yards of Electric Boat Div. of General Dynamics Corp.

Wellman will build it

Special Cranes
Coke Pushers
Gas Producer Plants
Ore Bridges
Charging Machines
Forging Manipulators
Gas Flue Systems
Gas Reversing Valves
Mine Hoists
Skip Hoists
Clamshell Buckets

→ Wellman coke pushers

...engineered for economical, trouble-free performance

Wellman Combined Coke Pusher, Coal Leveler and Door Extractor in operation at Bethlehem Steel's Lackawanna Plant.

● Many of the world's most modern byproduct coke oven plants are Wellman equipped. The Wellman Engineering Company's more than half-century experience in building heavy machinery guarantees sound design and expert construction. Wellman equipment provides peak economy, maximum safety and trouble-free performance under a wide variety of operating conditions.

THE WELLMAN ENGINEERING COMPANY

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Industrial Briefs

Warehouse Opened . . . EDGCOMB STEEL CO. opened a new metals product warehouse and office in York, Pa., earlier this month. A complete inventory of 4500 tons of metals will be maintained to serve large and small metal users in Central Pennsylvania, Maryland, and Virginia.

Sales Office . . . WOLVERINE TUBE DIV. of Calumet & Hecla, Inc., has opened a new sales office in Kansas City, at Broadway-Westport Bldg., 4050 Broadway, Thomas E. Goodyear will be sales representative.

Dividend . . . CONTINENTAL CAN CO., INC., New York, has declared a regular quarterly dividend of 60¢ per share on the common stock payable Mar. 15.

Doubles Capacity . . . ELECTRO MANGANESE CORP.'s new Loraine Street Plant now doubles the nation's supply of electrolytic manganese. During the month of December the plant reached rated capacity production.

Hear Ye . . . METAL HYDRIDES, INC., Beverly, Mass., has formed a new Metallurgical Development Dept. with Emanuel Gordon in charge.

Prexy Elected . . . J. L. Atwood, president, NORTH AMERICAN AVIATION, INC., Los Angeles, has been elected president of the Institute of Aeronautical Sciences for 1954.

West Goes East . . . VICTOR EQUIPMENT CO., San Francisco, bought a "substantial interest" in J. C. Menzies & Co., Chicago. Menzies will add equipment built by Victor to its line and absorb the present Victor sales force in Chicago.

Named . . . ALLIS-CHALMERS MFG. CO., Milwaukee, has named the Albany Wholesale Supply, Albany, Ore., a distributor for Allis-Chalmers motors, controls and transformers in Linn, Lincoln, Lane and Marion Counties in Oregon.

On the Way . . . INGALLS SHIPBUILDING CORP., Birmingham, recently celebrated the launching of its 150th ship at its Pascagoula, Miss., shipyards. The freighter was named the *SS Peninsula Mariner* in honor of the State of Florida.

In Operation . . . THE BLACK & DECKER MFG. CO.'s $2 million addition to its Hampstead, Md., branch plant is erected and is now beginning operation.

European Office . . . BECKMAN INSTRUMENTS, INC., South Pasadena, Calif., has opened a branch assembly plant and European sales headquarters in Munich, Germany.

Sets Up Division . . . ARTHUR G. MCKEE & CO., Cleveland, plans to set up a new industrial engineering division. David M. Checkley will be general manager of the new division.

Expansion Program . . . GENERAL ELECTRIC CO.'s Carboloy Dept. reports that an expansion program of over $1 million will be completed late in 1954 which includes the addition of 36,000 sq ft of floor space to the Dept.'s metals building.

Begins Shipment . . . PULLMAN-STANDARD CAR MFG. CO., Chicago, has started delivery on one of its largest postwar passenger car orders with the shipping of the first of 141 cars to the Canadian National Railways.

New Members . . . CONTROLLERS INSTITUTE OF AMERICA has elected William F. Berky, controller, Universal Winding Co.; and F. J. Sullivan, secretary and controller, Federal Screw Works, Inc., to membership in the institute.

Safety Record . . . The East Pittsburgh Divisions of WESTINGHOUSE ELECTRIC CORP., consisting of 18,000 people have just completed the safest year in the plant's 58-year history.

Well Managed . . . AMERICAN INSTITUTE OF MANAGEMENT, New York, reports that 17 companies in the metal industries have been certified as "excellently managed." Fourteen of them received the award for the fourth consecutive year.

Step Forward . . . U. S. STEEL CORP. has made another step forward in its district-wide smoke control campaign with the starting up of the new raw material processing unit at its Universal, Pa., plant.

Oak Park Plant . . . KENNAMETAL, INC., Latrobe, Pa., will construct a new manufacturing plant and office building at 10201 Capital Ave., Oak Park, Mich.

In Agreement . . . THE BABCOCK & WILCOX CO., New York, and Seaboard Refractories Co., Raritan Township, New Jersey, have concluded a manufacturing agreement under which Seaboard's entire manufacturing facilities will be devoted to producing special refractories for Babcock.

Net Reported . . . LUKENS STEEL CO., Coatesville, Pa., reports that net income for its fiscal year ending Oct. 24 was $3,607,713.

Appointed . . . ACME ABRASIVE CO., Center Line, Mich., has appointed the T. A. Reilly Co. as its Chicago district representative.

To Build . . . KOPPERS CO., INC., will construct a new mechanical development laboratory devoted to the refinement and adaptation of present products and processes plus the development of new products for the Metal Products Div. at its South Baltimore plant.

Gets Contract . . . DRAVO CORP. has been awarded a contract for the construction of eight welded steel barges to transport grain on the Mississippi River system, by the Arrow Barge Co., Inc., New York. Delivery is scheduled for the second quarter of the year.

New Home . . . MONARCH MACHINE TOOL CO. recently moved its Pittsburgh district office from 512 Empire Bldg. where it has been for 17 years, to 962 Greentree Road. Sales representatives there are W. B. Craig, district manager, and D. J. Harshbarger.

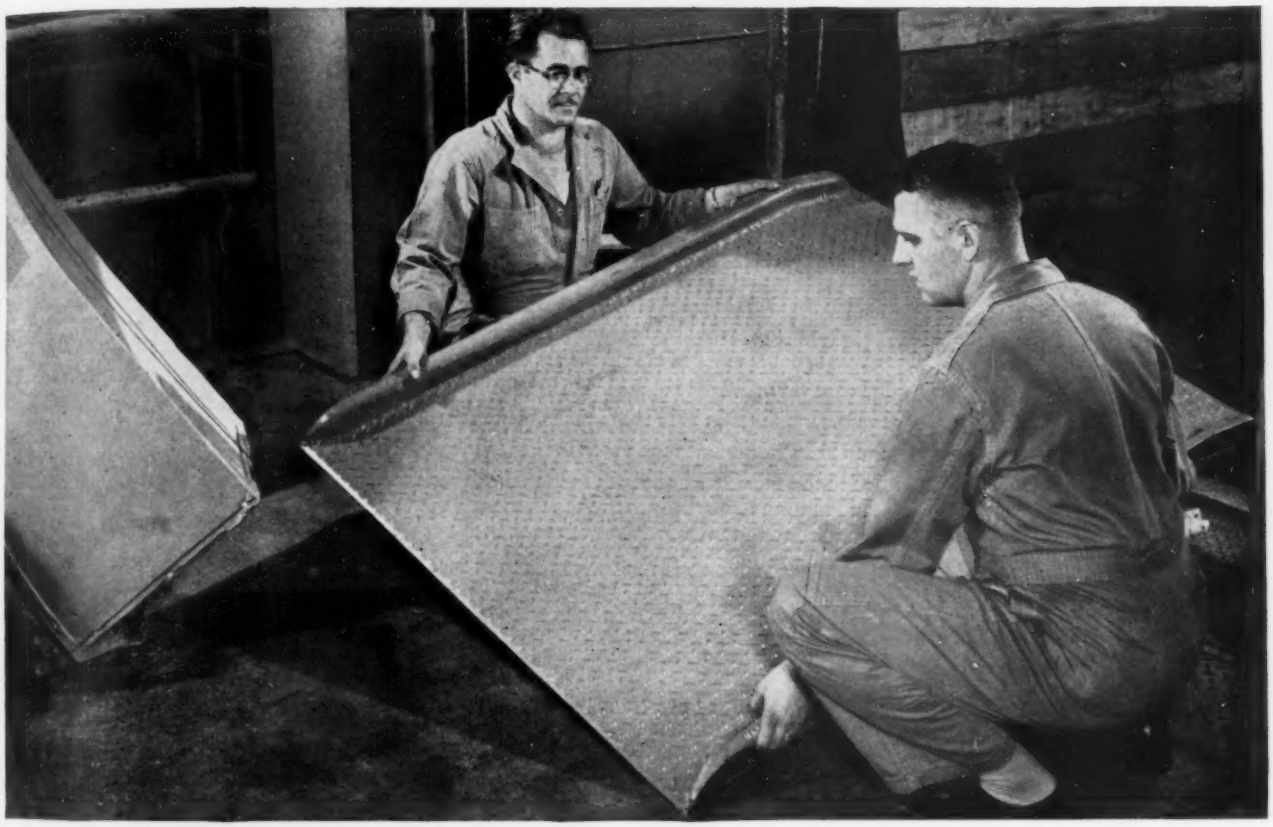
Appointed . . . ATLANTIC STEEL CO., Atlanta, has been appointed distributor in parts of four Southern states for steel building products manufactured by the Great Lakes Steel Corp., Detroit. John T. Butler will be head of the new activity.

Net Income . . . FOOTE BROS. GEAR & MACHINE CORP., Chicago, reports net income of $640,866 for 1953, compared with $682,828 for 1952.

DOW

MAGNESIUM MAKES FACTORY TOOLS LIGHTER AND EASIER TO HANDLE

Lightweight MAGNESIUM... world's lightest structural metal... improves portability, cuts cost of handling plant equipment



How much manpower do you waste handling heavy equipment? Unnecessary weight is needless expense ... and the answer is Magnesium, the world's lightest structural metal.

Dockboards are a good example. These bridges from loading docks to freight cars or trucks were traditionally made of steel. They were strong, but heavy and required four men to handle them! Today you can buy lightweight Magnesium dockboards with all the necessary strength—but easily handled by two men!

Magnesium is revolutionizing the materials handling and portable equipment field. One fourth the weight of steel, a third lighter than aluminum, Magnesium is making portability pay off.

If your operations require equipment that must be moved, look for products "Made of Magnesium."

For further information on the advantages of Magnesium, contact your nearest Dow sales office or write THE DOW CHEMICAL COMPANY, *Magnesium Department*, Midland, Michigan.

you can depend on DOW MAGNESIUM

DOW

Diemakers Hint New Chrysler in '55

Large volume of die orders placed by Chrysler may mean complete change in '55 body styling . . . Others plan Fall model introduction—*By R. D. Raddant.*

Chrysler Corp. may be revising the entire timetable for its divisions, moving up the date of complete body changes to hit the 1955 market.

This conclusion was reached from the volume of orders for new dies placed with automotive diemakers in and around Detroit, the late date of launching the retooling program, and the pressure by the auto company for earliest possible delivery.

Chrysler has made no statement about its 1955 program, nor is it likely to this early in the game. In fact, usually reliable sources within Chrysler deny any knowledge of a revision of original model plans. Nevertheless, diemakers have been asked to bid and orders have been placed on a big enough volume of dies to warrant this conclusion.

Orders Dies Early . . . Original Chrysler body schedule called for further face lifting of present basic styles for 1955 with a model introduction for most of its lines scheduled for late fall, probably November. But, say die manufacturers, the volume of orders now indicates that a complete restyling is in the works. Late placing of orders however will make it impossible to get out the new models until early in 1955.

Tool and die shops that usually do the work for Chrysler division had been concerned over delay in placing orders for the '55 models. This delay may have been because the corporation changed plans and entire scheduling of its program.

Predict Streamlining Stress . . . "They are asking for August delivery of the dies, but I don't see how they can get them before January," one prominent die manufacturer stated.

Another told THE IRON AGE that he had been shown most of the Chrysler program, had bid on a large portion of it, and received substantial orders.

"Chrysler is going to change its entire body styling, making the cars more streamlined than Ford and General Motors," he predicted. He concurred that the late placing of the orders would prevent a fall model introduction.

Of course, predicting new car developments on the basis of tool and die makers' opinions has its hazards. It's something like the fable of the three blind men describing an elephant with one grabbing its tail, a second feeling its leg and the third touching its side. No one shop sees the entire program and, in fact, may have the job for just one fender or another panel in its works.

Sales Factor Basic . . . There are other factors, principally economic, that would make a change in Chrysler plans logical. It is a well known fact that Chrysler is hard pressed to hold its share of the market with its present styling. During the past months Chrysler has made rapid strides in revitalizing its styling section and has made no secret of its plans for big things in styling in the years to come.

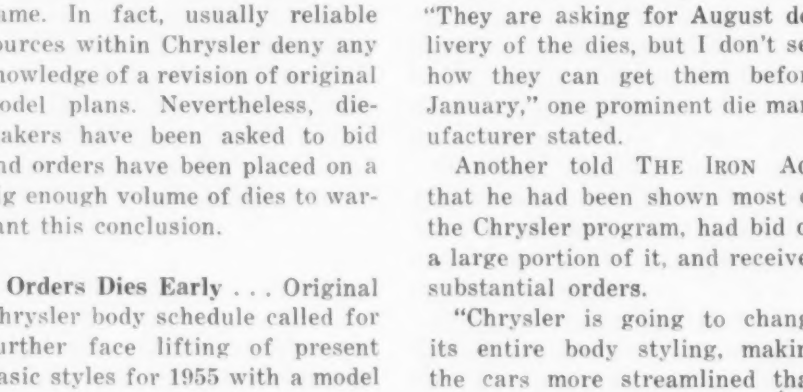
A change in plans as outlined here would be in line with this thinking, even though it is a drastic measure to take. Both Ford, which will change its entire three lines in 1955, and General Motors, which will have new bodies as well as engines for Chevrolet and Pontiac, have big die programs now.

Chrysler may have felt that it was a move that had to be made regardless of cost.

Revive Fall Styles . . . Continuing along tool and die lines, programs of all car makers, except the somewhat confusing Chrysler picture, point to a moving up of new model introduction to the autumn months.

This will be a return to the old schedule that existed before World War II and one that is being dictated by the return of competition. Harlow H. Curtice, GM's president, said as much in a press conference last week:

"Never during normal times did we consider December and Janu-



DREAM CARS highlighted GM Motorama Show which opened in New York last week.

ary as the most ideal period for the introduction of new models. There have been extenuating circumstances that have dictated that those periods be used during the more recent years, but if I were to hazard a guess I would say that 1955 models will probably come a little bit earlier."

Industry Welcomes News . . . Mr. Curtice's "hazarding a guess" might be considered the understatement of the year. He could probably have stated to the minute the progress of 1955 programs of every division.

In any event, tool and die programs for most automakers, with the exception of Chrysler, are well advanced and point to November introductions in most cases. This is welcome news for all branches of the industry including production, sales, and labor. Automakers are assured of a more stable employment year instead of the prospect of overtime in the early months followed by layoffs.

Fisher Plans Growth . . . GM's Fisher Body Div. will be an important beneficiary in the parent company's recently announced $1 billion expansion program. Partial announcement of Fisher plans came last week from James E. Goodman, GM vice-president and Fisher general manager.

Both stamping and assembling plants are included in the program which will add over 1 million sq ft to the division's bodybuilding facilities. At present Fisher has approximately 20 million sq ft in its network of plants.

The division operates 8 stamping plants, 15 assembly plants, 8 plants engaged in tooling, engineering and research work and 2 defense plants. It also supplies 7 additional GM assembly plants in this country and 22 plants abroad.

Fisher plants are located in 19 cities in 10 states. Plants in Kansas City, Mo.; Janesville, Wis.; Cleveland and Hamilton, Ohio; Grand Rapids, Pontiac, and Flint, Mich.; and Pittsburgh will share in the expansion program.

High Octane:

Study shows possible saving in use of higher rated fuel.

Since the introduction of the high compression engine, speculation on the future use of higher octane gas and its possible economies has been almost continuous. Some of these questions are answered in a recent study by W. M. Holaday of Socony-Vacuum Laboratories.

Possible economies hinge on two factors: the miles per gallon that can be obtained from a higher compression ratio and the octane rating that is required for that ratio.

He estimates that the 1952 average compression ratio of 7.2 to 1 resulted in an average of 14 miles per gal. A ratio of 8 to 1 yields 17.3 miles per gal. Going higher, a compression ratio of 10 to 1 would result in increasing fuel economy 12 pct more to 17.3 miles per gal and to 17.9 miles per gal for a 12 to 1 ratio.

This shows the economy in terms of fuel consumption, but not all of the gain in miles per gal would be translated into miles per dollar. Mr. Holaday concedes that higher octane gas will cost the motorist more.

"The installation of these processes for the manufacture of higher octane gasolines represents a sizable investment to the petroleum industry and will necessarily alter the current gasoline price structure," he points out. The increased cost, however, would not take away more than a part of the economy factor. More miles per dollar are in line when engine design and fuel production get together on higher compression and higher octane.

Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
Jan. 23, 1954..	125,892*	25,675*
Jan. 16, 1954..	122,991	26,610
Jan. 24, 1953..	120,314	29,236
Jan. 17, 1953..	118,110	29,939

*Estimated. Source: *Ward's Reports*

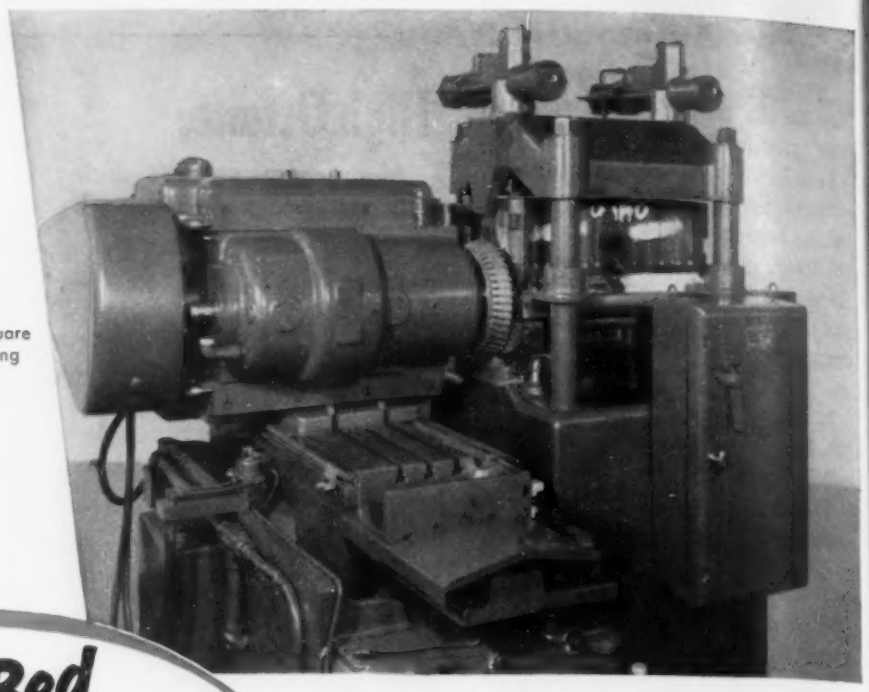
THE BULL OF THE WOODS — **By J. R. Williams**

AH, HOW I LOVED IT--HOW I THRILLED WITH THE ROARING POWER AT MY FINGERTIPS! THE PRIDE I FELT IN DIFFICULT JOBS WELL DONE--I LOVED EVERY DAY OF IT-- AH-H-H!
TH' BIGGER THEY ARE TH' BETTER THEIR LINE GETS! I NEVER KNEW A GUY TO STRUGGLE SO HARD TO GET UP WHERE HE COULD HIRE IT DONE!
YEH, THEY LOVE THEIR WORK BUT SOMEBODY ELSE IS GEN'RALLY DOIN' IT!
1-29
J.R.WILLIAMS
NOSTALGIA
Copr. 1954 by NEA Service, Inc. T. M. Reg. U. S. Pat. Off.

PRODUCTION DATA:

Part Name	Cylinder block
Material	Cast iron
Operation	Mill flywheel end square with crankshaft bearing
Cutting Speed	300 feet per minute
Feed	25" per minute
Production	30 per hour

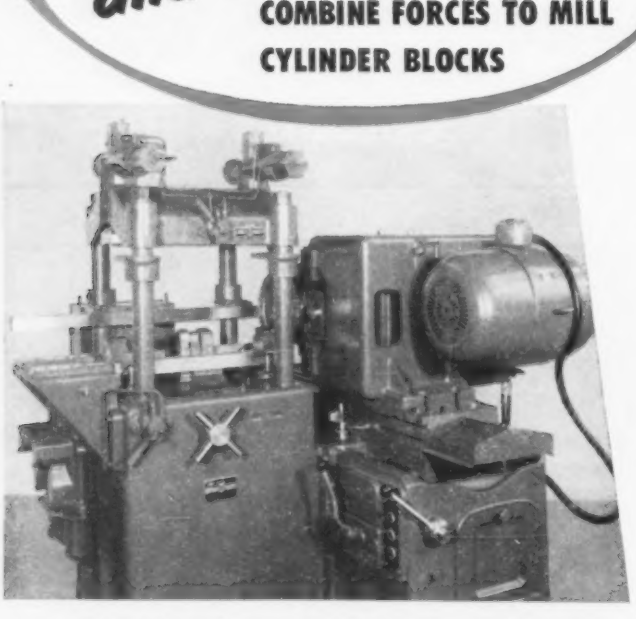
CINCINNATI



Familiar units comprise this CINCINNATI special purpose miller. In this view, a cylinder block is clamped in position for the milling operation.

Hydromatic Bed and Dial Type Head

COMBINE FORCES TO MILL CYLINDER BLOCKS



Operator's working station, showing comparative simplicity of Hydromatic and Dial Type combination.

Unorthodox procedures sometimes work out to advantage. In this example, the work and cutter spindle head have been interchanged for an accurate milling operation on cylinder blocks. A lower unit cost resulted, and here are the reasons why. ¶The machine, basically a CINCINNATI No. 3-24 Hydromatic Miller, is equipped with a spindle carrier mounted on the table, and a "dummy" headstock which incorporates a conveyor height fixture. The spindle carrier may look familiar to you . . . with minor alterations, it's the standard vertical head of a CINCINNATI No. 3 Vertical High Power Dial Type. To reduce physical effort for the operator, the fixture is pneumatically operated. A 12" diameter sintered carbide cutter takes the cut at 25" per minute. ¶Cincinnati Application Engineers are expert at taking standard units of CINCINNATI Milling Machines and putting them together with a minimum of special work. Whether it's a tailor-made machine or merely a special unit, you can be sure of justifying your replacement policy with CINCINNATI handling your milling problems. May we hear from you?

THE CINCINNATI MILLING MACHINE CO.
CINCINNATI 9, OHIO

THE CINCINNATI HYDROMATIC LINE:

Plain and Duplex styles, conventional and tracer controlled types, 18 sizes of each, 24" to 90" table traverse, 10 hp to 50 hp drive, standard and complementary unit construction for flexibility in building single-purpose machines.

1—Plain Hydromatic. Catalog No. M-1670-2
2—Duplex Hydromatic. Catalog No. M-1670-2
3—Plain Tracer Controlled Hydromatic. Catalog No. M-1602-2
4—Duplex Tracer Controlled Hydromatic. Catalog No. M-1602-2

CINCINNATI

MILLING MACHINES • CUTTER SHARPENING MACHINES • BROACHING MACHINES • METAL FORMING MACHINES • FLAME HARDENING MACHINES
OPTICAL PROJECTION PROFILE GRINDERS • CUTTING FLUID

Army to Trim Buying and Inventories

Outstanding orders will be cut in half . . . Survey places Army inventories around the world at $30 billion . . . Expect pay-as-you-go for corporate income tax—By G. H. Baker.

Immediate effect of the Army's decision to slow up its rate of procurement and "live off the pantry shelf" in the months ahead is to be a trimming of procurement orders to $5 billion by June 30. Comparison: Outstanding orders were valued at $11 billion on July 1, 1953, and at $13 billion a year ago.

The dregs of two world wars and years of neglect (as Deputy Under Secretary Pearson puts it) have left the Army heavily overstocked with goods of all types. A survey conducted by Pearson shows that the Army has about $30 billion in inventories around the globe. This figure does not include material in the hands of combat forces, nor does it include the Army's vast real estate holdings.

Drastic Changes . . . Result is the Army is to step down from its position as "the biggest customer in the world." Acting at Pearson's orders, the Army is unloading surplus items at a rate of about $150 million a month. Value of its surplus stores is about $2.5 billion.

In future ordering, the Army is to be guided by these cost-saving standards:

(1) Contracts for about 247,000 items are being "open-ended," thus ending the old policy of letting new contracts from time to time for specific quantities of goods.

(2) Contracts for standard commercial products call for shipment directly from manufacturer to military consumer. This will reduce costly re-handling operations at Army supply depots.

(3) Contracts for commercial products are being designed to permit only 3-month supplies, with another 6 months of supplies on order.

Income Tax Changes . . . Pay-as-you-go basis for filing corporation income tax returns is in the offing. Whether or not Congress will act to put such a plan into effect this year is an open question. But serious thought is being given in tax-writing circles (both at the Treasury and at the Capitol) to spreading out the Federal Government's tax "take" within the period of each fiscal year.

Under the plan now being discussed, corporations would make estimates of current year earnings and would start making payments in September and December of the year in which the income was earned. Effect would be to provide the government with more income in the late summer and autumn months when receipts are now very small as compared with receipts for the winter and spring months. As a result income flow would be on a more even basis.

Defense Setasides Reduced

Defense setasides for second-quarter use by manufacturers of "A" products will run 13 pct below first quarter for steel, 20 pct less for copper, and 15 pct lower for aluminum.

Allotments under the Defense Materials System for second quarter 1954 have been established as follows:

Steel, 1,273,720 tons, down 193,000 tons; copper and its alloys, 133,000,000 pounds, down 34,000,000 pounds; aluminum, 143,000,000 pounds, down 24,000,000 pounds.

Total quantities of the metals set aside at mill level include the additional amounts for B products which are incorporated into military end items.

Gambler's Chance . . . St. Lawrence Seaway legislation gained approval of the U. S. Senate last week in a smashing 51-33 vote endorsement, but an uphill fight in the House lies ahead.

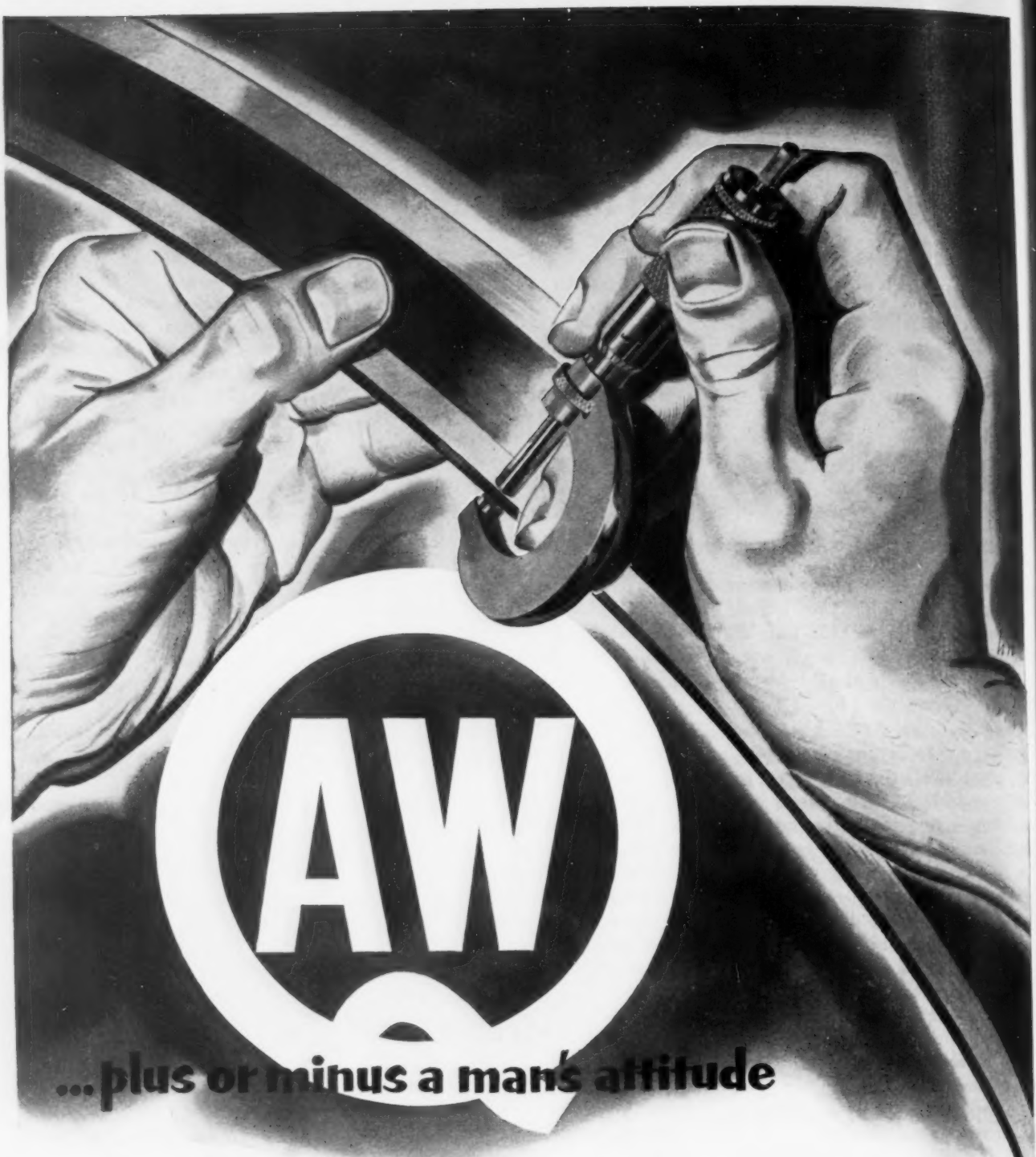
Personal appeal from President Eisenhower to the predominantly anti-St. Lawrence House Public Works Committee may switch a sufficient number of votes to push the project over the hump of port-area opposition. Of the 29 members of the House Public Works Committee, the seaway project apparently was favored by only 11 members—an insufficient number to spring the bill from the committee to the House floor for action.

Seeks Oil Power . . . Navy plans for building a "national emergency" pipeline between its Elk Hills, Calif., oil reserve and Los Angeles draw a "show me" attitude from members of Congress. Both the Navy and the National Security Resources Board are agreed that a major war or national emergency would require fast transportation of oil products to coastal points.

Principal objection to present arrangements is that the Elk Hills oil fields may not be ordered into full production except by joint resolution of Congress. Navy wants the power to order full production, as well as authority to sell Elk Hills oil by negotiation rather than by public bidding in time of emergency. Congressional attitude is that the Navy has no real reason for gaining such authority in time of peace.

Idea Chairman . . . Scientific ideas are becoming particular responsibility of Gordon Dean, former Atomic Energy Commission chairman.

Mr. Dean, now with the New York banking firm of Lehman Bros., was named last week as head of the advisory board of Basic Research Corp., in Washington. He will assist in directing a



AWQ stands for American Welding Quality. Perhaps we can best describe it as the attitude of craftsmen, proud of their know-how and ability to produce welded rings, bands and welded assemblies . . . or to be more specific, craftsmen who treat every job with the same degree of care that you insist upon in your own plant.

If your requirements involve either fusion or resistance welding of ferrous or non-ferrous metals, call or write us. We can put our 35 years of welding experience — the latest techniques and equipment—and 1600 conscientious hands to work for you.

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national program to provide for more research by colleges and universities. Basic Research will channel money for such projects.

Foreign Trade:

Randall commission proposals . . . Extend President's power.

Presidential power to work out commercial treaties under the Trade Agreements Act will be extended for at least 3 years if Congress decides to go along with a key recommendation just disclosed by the (Randall) Commission on Foreign Economic Policy.

Agreement among the 17-man membership on this point is evident in its new report to the White House and Congress. This harmony is not characteristic of many portions of the 100-p. document.

Much dissenting data, especially in relation to increased imports and the buying of foreign raw materials, appears in the study.

The commission, however, is solidly behind continuing the President's trade-treaty negotiating power on more than a single-year basis. Short-term grants of this authority, the group maintains, have brought on an "aura of instability" in national commercial operations.

As a legislative check on the President's leeway in effecting trade agreements, he would be required to report annually to Congress on such matters as tariff rate changes, understandings reached with foreign governments, and reciprocal concessions gained.

Following negotiations between the U. S. and other countries affected, the President would have authority to lower present tariff duties by not more than 5 pct per year for the first 3 years after he obtains his extended power. He could also make stipulated reductions in rates applying to products imported in low-volume amounts, with or without getting reciprocal concessions.

The Randall group recommends amendment of the Buy American Act to empower the President to make exceptions in the case of bidders from foreign countries which treat U. S. bidders on the same basis as their own citizens. Even before the act is amended, he could order federal buyers "in the public interest" to consider bids from abroad which can compete on a price basis and meet other requirements.

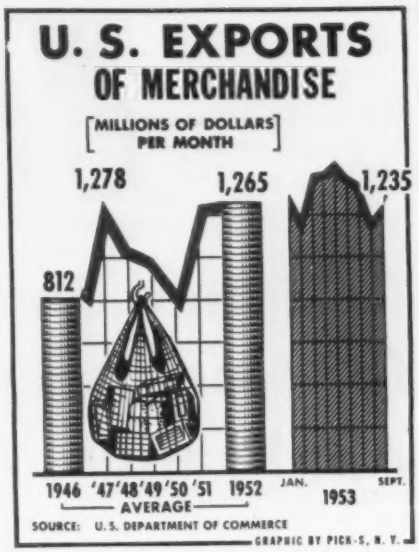
Health:

Ike's health plan proposals . . . How reinsurance works.

Putting an increasing number of disabled workers back on the job is one of the primary aims of President Eisenhower's health program as presented to Congress. The President pointed out that 250,000 workers are disabled to some extent each year and that the loss to the labor force is serious when only 60,000 workers return to their jobs as happened last year.

With increased state contributions, Mr. Eisenhower estimates, as many as 660,000 persons could be prepared for active jobs in the next five years.

Other elements of the presidential message, which brought divided comment in Congress, call for limited federal reinsurance of prepaid health plans, strengthening of U. S. Public Health Service research activities, and expansion of the Hospital Survey and Construction Act to provide added federal aid in building nonprofit hospitals for the chronically ill.



Initial fund suggested for the reinsurance service is $25 million to be used in encouraging health insurance companies to offer more complete coverage to more people. The fund would be retired by reinsurance fees charged to the companies.

To get the Administration program started, Chairman Charles A. Wolverton, R., N. J., of House Commerce Committee last week submitted a bill (H. R. 7341) to provide $20 million a year in federal money for diagnostic centers and $10 million a year each for rehabilitation facilities and nursing homes.

These funds would become available to the states on a matching basis similar to that used in the current hospital construction system.

Ease Cobalt, Nickel Export

Cobalt, alloys, and chemicals, previously under quantitative export restrictions, have now been open-ended until new notice as a result of the improving supply situation.

At the same time, the U. S. Commerce Dept. has lifted the ban on exports of nickel anodes and powder.

When the Going's *Rough!*

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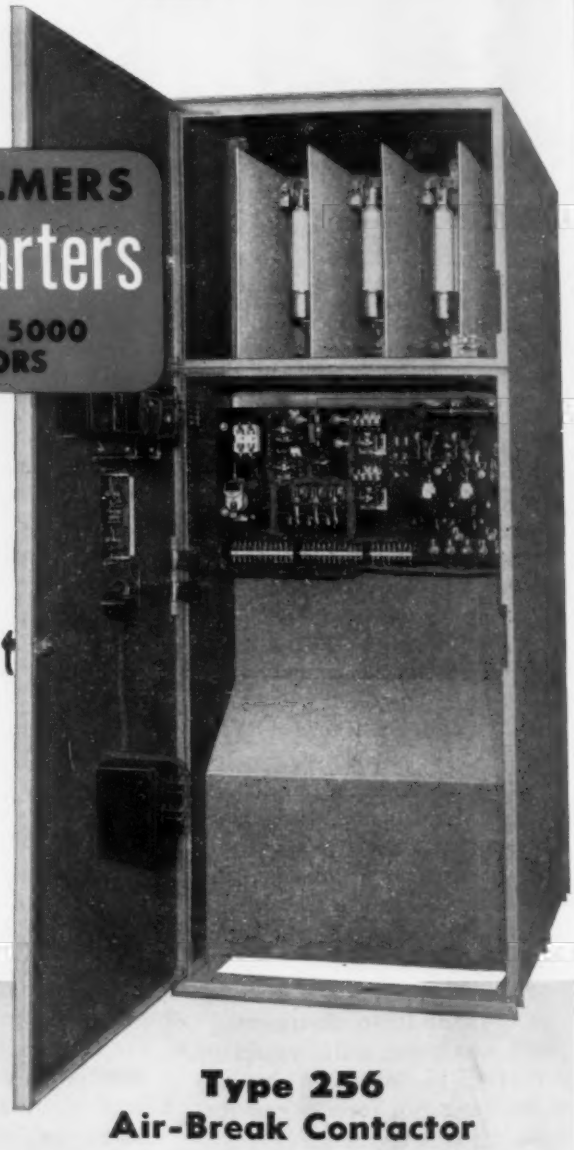
ALLIS-CHALMERS
Type H Starters
FOR 2300 TO 5000 VOLT MOTORS



HERE IS A STARTER that is as rugged as the steel industry itself. All the starter's components . . . contactors, meters, overload relays, current limiting fuses, auxiliary switches . . . are engineered and coordinated to meet heavy duty steel mill demands — to provide high capacity interruption and complete protection for man, motor and machine.

Exemplifying the ruggedness of the Type H starter is the 256 air-break contactor. Frequent starting, inching, reversing or dynamic braking are taken in stride by this dependable performer. Contactor operations can be numbered in the millions with only routine servicing.

In many steel mill applications demanding high repetitive duty, the Type H starter can be used in place of circuit breakers . . . affording substantial savings in initial cost *and* upkeep. Find out how the Type H starter fits into your control picture. Call your nearby A-C representative or write Allis-Chalmers, Milwaukee 1, Wis. Ask for bulletins 14B6410B and 14B7303.

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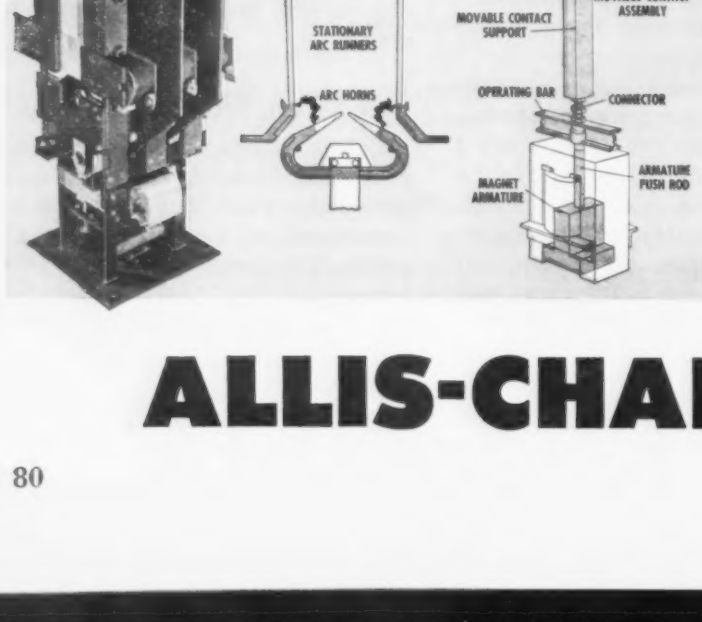

Type 256 Air-Break Contactor

Double-break contacts, vertical action and dual blowouts provide long, trouble-free life. No turning shafts, shaft bearings or flexible leads to cause maintenance headaches.

ALLIS-CHALMERS

Auto Output Soared 34 Pct in '53

California assembly plants turned out 662,636 cars and trucks last year . . . GM increased lead over Ford . . . Independents output declined—By T. M. Rohan.

California auto assembly plants last year set all time highs in production and the Big Three are off to a good start this year.

A check last week revealed California plants in 1953 turned out 662,636 cars and trucks, a 34 pct increase over 1952 production of 494,396 and 6 pct over the automakers' '53 forecast of 625,000 (THE IRON AGE, May 14, '53, p. 71.)

GM Gains . . . The top producer, General Motors, increased its lead over second place Ford by about 10,000 units, GM turning out 299,000 to Ford's 209,636. Chrysler also registered a 6 pct gain with 105,000 compared to 99,750 for last year. Heaviest production was in the Los Angeles area where 490,000 autos and trucks were assembled.

The three independents with California plants, Studebaker, Nash and Willys, registered a combined production slip of 6500 units, with 49,000 in 1953 compared to 55,536 for 1952. They assembled only 62 pct of the 79,000 units predicted for them as 1953 output.

Parts Bidding Heavy . . . A Ford official in California said bidding is heavy on parts for the 1955 Ford. He said western firms are bidding on tie rods, U-bolts, seat supports and similar items which traditionally come from Detroit and the Midwest. Another major item is gasoline tanks, and if western steel producers gather enough tonnage to make runs of the special steel required, this may be added to list of western-made components.

No auto producers would stick their necks out for this year, but the traditional enthusiasm is apparent. California Ford plants are all working overtime, generally 9 and 10-hour shifts, and have scheduled heavy first quarter production.

The Richmond, Calif., plant, for example, has scheduled first quarter production at 26,000 compared to 14,000 for the first quarter last year. Favorable weather has accelerated construction of the $50 million Milpitas assembly plant which is now 4-6 weeks ahead of schedule. Production is expected early in 1955. Installation of machinery is expected to start during April.

Wheels Rolling . . . Norris-Thermador of Los Angeles, which supplies most of the wheels for western assembled cars (except Willys and Nash), boosted output this year to 400,000 per month, compared to last year's peak of 160,000 per month.

A second stamping line was added and production of Buick wheels represented substantial extra tonnage for 1954 models.

U. S. Spring & Bumper Co. of Los Angeles, veteran California auto supplier, racked up a 45 pct sales increase in 1953 compared with 1952. Total sales were $19 million.

The firm turned out over 1 million bumpers, used 250 tons of steel per day for all its product lines. The firm's farm equipment line, consisting of harrows, cultivator shanks, cotton sweeps, has also shown signs of improvement so far this year. Highway guard business has remained at a fairly steady rate.

California Auto Production

	1953	1952
General Motors	299,000	209,256
Ford	209,636	129,854
Chrysler	105,000	99,750
Studebaker, Nash, Willys	49,000	55,536
	662,636	494,396

"Confidentially, I didn't think J. B. would be so honest in grading those aptitude tests he made us take."

More Tin Cans . . . California's canning industry continues to grow. Pacific Can Co. last week announced it was putting in a new $2.5 million plant at Sunnyvale, Calif., and a $1 million expansion of its Los Angeles plant.

The Sunnyvale plant which will be in operation for the 1955 season will raise Pacific's total output to over 1 billion cans per year. This is roughly about 15 pct of the state total, remainder being split between American and Continental. The Sunnyvale site near San Francisco replaced earlier plans for an additional Los Angeles plant.

The new plant, which will be about 50 pct operative by July 1, is intended to take pressure off the firm's San Leandro, Calif., plant by providing additional capacity for production of special cans for soft drinks and lithographed cans. Pacific is marketing a flat-top can with heaviest commercially available tinplate coating while Continental is pushing cap-top cans with a conical top and conventional cap.

Users report excellent results with New Sunicut S Oils

In just six months, these unique new straight cutting oils have "Job Proved" themselves as top performers in many metalworking shops all through the industry.

Reports like these keep coming in:

AN AUTO PARTS MANUFACTURER INFORMS US, "Threaded parts are as much as 50° cooler when they come off the machines. And our operators like the clear, clean, odorless qualities of Sunicut 102-S."

SCREW MACHINE SHOPS REPORT, "The versatility of Sunicut 209-S permits us to reduce the number of oils we must stock."

BROWN & SHARPE SCREW MACHINE OPERATORS SAY, "Sunicut 11-S increases tool life, gives finer finishes, eliminates staining problem."

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Leasing May Ease Replacement Snarl

Tool builders work out flexible leasing plans to speed replacement of obsolete tools . . . Manufacturer has choice of buying or returning tool—By *E. J. Egan, Jr.*

The machine tool industry is unlimbering a big gun to train on its major sales target, the replacement of the country's obsolete metalworking equipment. Tool-leasing is the weapon designed to blast loose thousands of outmoded machine tools, substituting the latest models to increase production and trim costs.

First salvo of the campaign was fired last week by the Kearney & Trecker Corp. of Milwaukee. The company announced a program of three flexible plans by which metalworking firms could lease any machine tool in the K & T line, and either give it back or buy it within a 7-year period. Warner and Swasey of Cleveland have pretested the idea also, and are expected to announce a similar leasing program shortly. Other builders will probably follow with their own versions to stimulate lagging sales. Such plans will be added to the regular sales policies of these firms.

Only One Answer . . . Industry has begun to recognize that much of its metalworking equipment has seen its best days. Machine tools 10 and 20 years old are not always fast enough, smooth enough, precise enough to do the job as price competition gets rougher in the scramble for business. Labor and material costs are still high, and there doesn't seem to be much of a drop in sight for these factors. So the cost-cutting spotlight falls on equipment that promises to do the work better, faster—and lots cheaper.

But tool builders realize it hasn't been easy to make the dream of new equipment come true. It takes real money to buy machine tools outright, and in many cases the necessary capital just isn't there. Nor is borrowing always the answer, especially if the credit limit has already been stretched to fill other pressing needs for more inventory, other equipment, plant improvements.

Can Settle Doubts . . . Sometimes, even with funds available, prospective customers hold back because they're just not certain the machine they have in mind will really do the job so much better. Or maybe the work program lined up for a particular machine tool won't last more than a year or two.

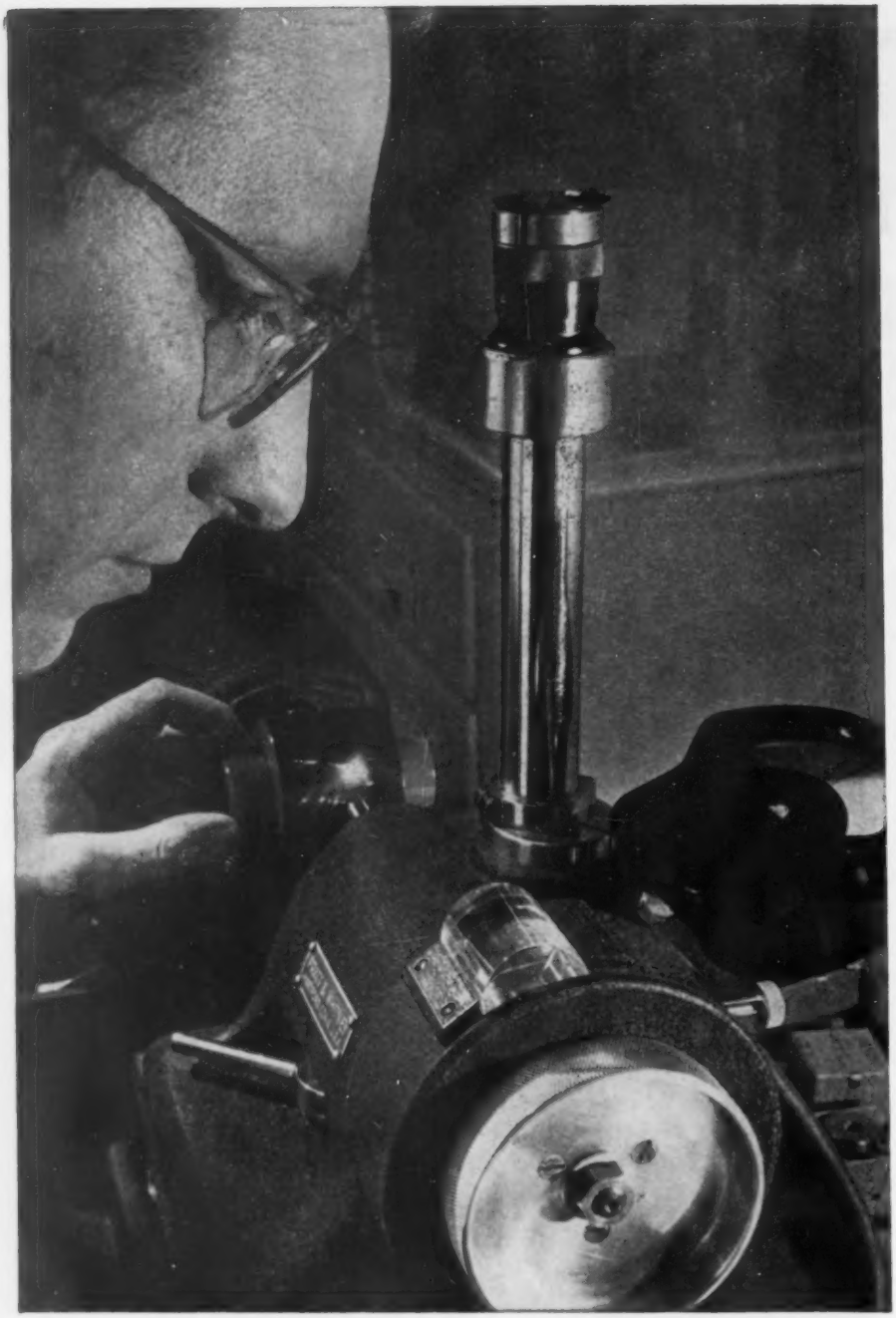
Kearney & Trecker hopes its flexible leasing plans will help industry over some of these hurdles and result in real action that will keep their own production going full tilt. If the plan works, and several years of pre-testing have convinced K & T officials that it should, there will be a mutual benefit for builder and user.

The practice of leasing machinery and processing equipment isn't new. Food machinery, materials handling equipment, office machines, trucks and automobiles are among many items available on beneficial leasing arrangements. Machine tools have been leased also, but mostly by machinery dealers in local areas. The K & T program is the first to offer an entire builder's line on a nationwide basis. A condensed comparison of the plans is tabulated in the chart below.

KEARNEY & TRECKER TOOL-LEASE PLANS

	PLAN A		PLAN B		PLAN C	
No. of Years	Rental Fee as Pct of List Price	Pct of List Price Due	Rental Fee as Pct of List Price	Pct of List Price Due	Rental Fee as Pct of List Price	Pct of List Price Due
1	25%	....	30%	....	35%	80%*
2	25%	....	25%	60%*	25%	60%
3	25%	45%*	20%	45%	15%	45%
4	10%	40%	10%	40%	10%	40%
5	10%	35%	10%	35%	10%	35%
6	10%	30%	10%	30%	10%	30%
7	10%	25%	10%	25%	10%	25%

NOTE: The customer may purchase or terminate at the end of the designated (*) year, or any year thereafter.



This Doubting Thomas Has to Be Shown

HE DOESN'T even trust master gages. And for good reason: these master gages—responsible for the accuracy of Federal's inspection line gages—*have* to be right. So they are painstakingly calibrated in a temperature-controlled room on a machine accurate to 0.000010 in.—ten millionths of an inch! It's not often you see a manufacturer gaging his own master gages, but at Federal this is typical of the extra care taken to assure accuracy in all phases of production. And it is your assurance of friction-free performance in every Federal bearing.

The Federal Bearings Co., Inc., Poughkeepsie, N. Y.

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REPORT TO MANAGEMENT . .

Doctrine of optimism

Men in politics doing less have been cited for statesmanship--so we call the doctrine of optimism in recent statements of four industrialists economic statesmanship. It must have braced the country's economic confidence--and shamed those whooping it up for a politically convenient recession. Though the countering of recessionism is of immediate value, it must be second in significance to the promise of this maturing economic creed--that big business must plan for long-term progress.

In words and action

This creed was expressed when GM's Harlow Curtice pledged $1 billion for new facilities in 2 years, Henry Ford II termed unemployment a delusion, Westinghouse's Mark Cresap, Jr., saw output of his firm gaining 45 pct by 1957, and DuPont's Crawford Greenewalt was positive of "amazing and dynamic industrial progress" in future years.

Sure of prosperity

General Motors is so sure of expanding markets it will invest proportionately much more money in the next 2 years than it did in the eager markets of the last 8. To Mr. Greenewalt, the belief that the country could loaf along on an economic plateau, uplifted only by a rise in population, was "nonsense." Instead, prosperity will be made by our "genius and inventiveness."

The trend's always up

What kind of a trend is this--the unimaginative may ask--where major industries greet today's sales dips and tomorrow's uncertainties with bolder plans for expanding markets? Without glorifying it, let us say that this economic thinking has been proved realistic by continually upsurging production in the past. True, the pattern has been one of lag and leap as we grew gaunt in depression, husky in booms. But the trend has always been up. More large corporations have adopted this economic philosophy. Witness home appliance expansion and optimism.

Expansion benefits now

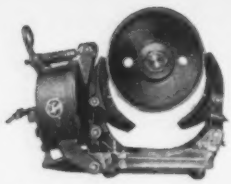
Can expansionist planning work for small industry as well as large? One manufacturer crystallized the problem for smaller firms when he said, "If I expand when I shouldn't, I will have a terrible time surviving." Expansionist thinking may not be cut to everyone's needs--but its benefits can extend to everyone. With their immense finances, big corporations expanding for future markets underwrite an important volume of business and create jobs in the present. Serving as economic spearheads, they bolster the assumption that a better standard of living must evolve.

Soften dips, shortages, inflation

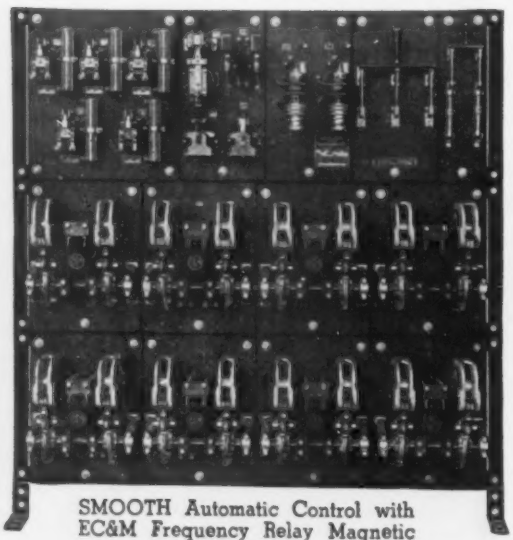
With expansion orders of large corporations constantly lubricating industry, the valleys of economic decline cannot be quite so deep. Future business buildup is being spread out into the present. Nor will the boom tendency to bunch up a decade's orders for machinery, etc. within a short space of time be so severe. Shortages and inflation may consequently not be so vicious. For 1954, GM's pledge of heavy capital outlay may do much to discourage withdrawal of expansion, modernization plans--and a good part of our prediction for '54 prosperity is based on capital outlay.

Complete CONTROL for CRANES by E&M

SHORT-THROW Narrow-width Cam Master Switches are easy on the operator.



LONG - LIFE Brakes give high-speed performance — with low up-keep.



SMOOTH Automatic Control with EC&M Frequency Relay Magnetic Controllers.

Users Know EC&M Equipment Gives Top Performance . . . Low Up-Keep

EC&M Crane Apparatus and Control Engineering have a reputation for eliminating initial delays and for permitting production to be maintained at a high level throughout the life of the investment.

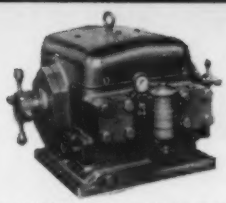
EC&M Crane Equipment is specially engineered for *each* crane. EC&M has *always* built control from the crane data sheet. Relay-settings, resistor-fillings, brake-windings, etc., are matched to the actual crane-loading. Result is top performance right from the start.

Many crane users, when buying new cranes or revamping existing installations, specify EC&M Control. They know the extra margin of safety built into EC&M Equipment and the accurate engineering of the apparatus result in freedom from delays—smooth performance. Write EC&M into the specifications for your next crane.

THE ELECTRIC CONTROLLER & MFG. CO.
2698 EAST 79th STREET • CLEVELAND 4, OHIO

When Buying Cranes . . . Specify EC&M CONTROL

Fluid power draws a tub!



Two OILGEAR Type "DX" Two-Way Variable Delivery Pumps with three-position remote control, used on huge LAKE ERIE presses forming bathtubs.

...another example of how Kaydon precision bearings help solve design problems

On huge hydraulic presses with capacities up to 7000 tons, power control depends on fluid-power variable delivery pumps. The better the pump, the more versatile, efficient and reliable the press. OILGEAR, in designing their famous Power-Pack pumps, required high precision, heavy-duty bearings. Like many other manufacturers, they asked KAYDON to design and produce special bearings to meet their requirements. If you have problems involving bearings, contact KAYDON of Muskegon . . . producers of high-precision bearings that pay off in better products.

THE KAYDON ENGINEERING CORP.
MUSKEGON, MICHIGAN

KAYDON Types of Standard and Special Bearings: Spherical Roller • Taper Roller • Ball Radial • Ball Thrust • Roller Radial • Roller Thrust • Bi-Angular Bearings

KAYDON

KAYDON Radial Roller Bearing: 9.4483" x 17.3228" x 2.835", used in OILGEAR Power-Pack pumps.

FOR ALL TYPES OF BALL AND ROLLER BEARINGS: 4" BORE TO 120" OUTSIDE DIAMETER

CORRECTION!

•

A serious misconception has come about concerning our firm.

It seems many people, including some of our customers, think we do only X-Ray testing. This just isn't so. We have a complete quality control laboratory that is fully equipped to do spectrographic, metallurgical, physical and chemical testing on any material. Furthermore, our staff is made up of experienced technicians who are acknowledged specialists in the field of quality control. We offer you the opportunity of having all your testing done by one laboratory. Which is easier for you . . . and much more economical and efficient.

•

X-RAY INCORPORATED

X-RAY INCORPORATED,
13931 Oakland, Dept. 11-B, Detroit 3, Michigan

Please rush me full details on how I can centralize all my testing in one laboratory.

Name_____

Address_____

City_____ Zone____ State_____

—Free Publications—
Continued

Push-buttons

G-E line of oil-tight push-buttons, with special emphasis on color ring identification and building-block combinations, is described in new two-color publication available from company. Bulletin uses more than 35 photographs and drawings to illustrate the line's flexibility, its maintenance and the various types of units and switches that are available. Also included are ratings and dimension diagrams. *General Electric.*

For free copy circle No. 12 on postcard, p. 87.

Hydraulic ramp

Information detailing a 10,000 lb capacity hydraulic adjustable ramp for loading docks has been issued by Rowe Methods, Inc. Known as the Commercial Adjust-A-Dock, Model No. 6 N.F., its push button control instantly positions the deck to the desired height. Instant acting control provides smooth, level and substantial ramp for freight transfer to and from loading docks and trucks. The Adjust-A-Dock can be installed recessed in the dock, partially recessed or installed in front of the dock. *Rowe Methods, Inc.*

For free copy circle No. 13 on postcard, p. 87.

Surface finish

Importance of surface finish is detailed in new booklet issued by Brush Electronics Co. Booklet is divided into five sections telling how surface finish control affects various mechanical, operational and economic factors of a machined part, how it reduces machining cost, how it helps increase production capacity and improve products, and finally, one section gives complete data on Brush's new product, the Surfindicator. *Brush Electronics Co.*

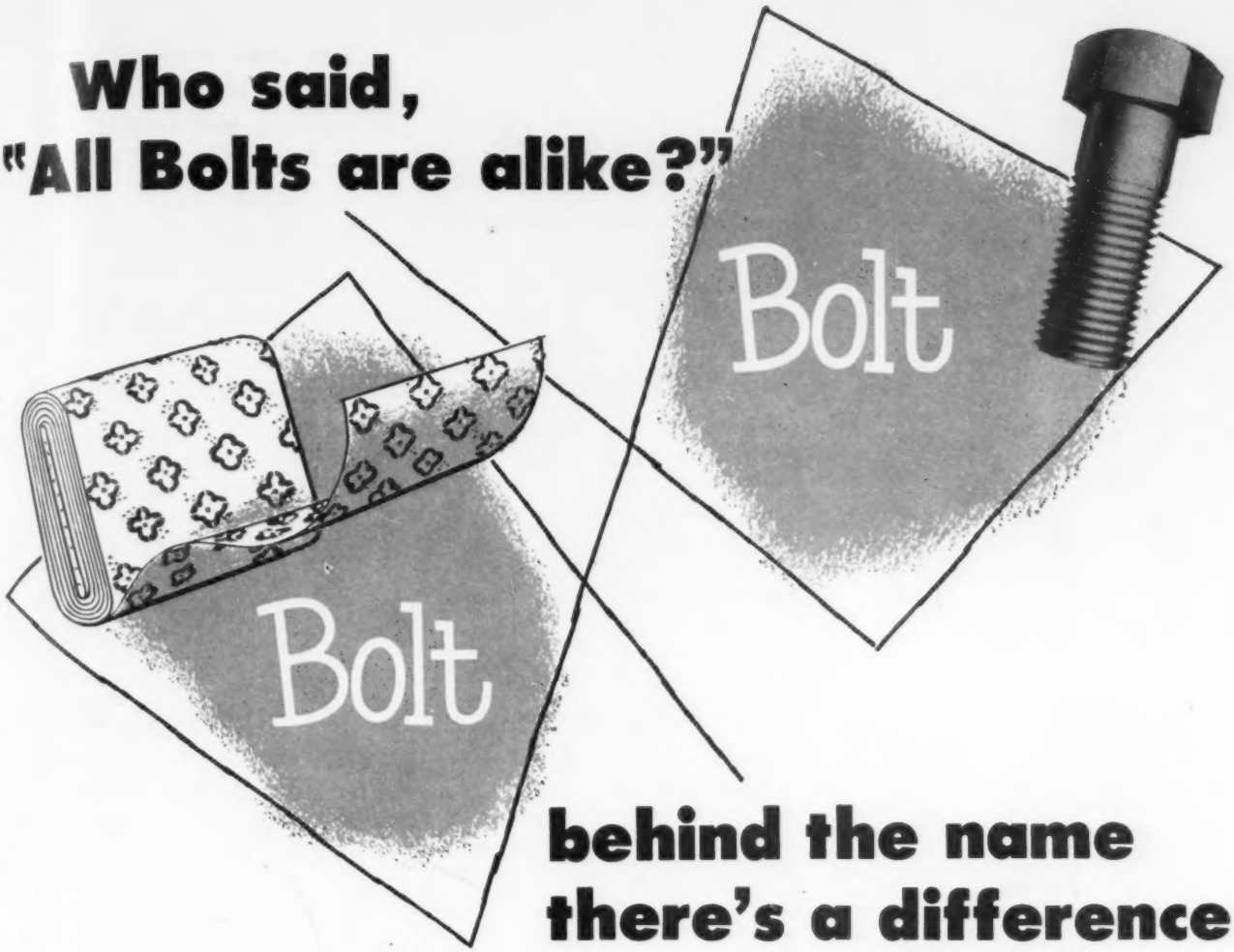
For free copy circle No. 14 on postcard, p. 87.

Surface grinder

Ex-Cell-O Corp. now has bulletin available on Style 84 Precision Surface Form Grinder. Machine is used for grinding flat, grooved or curved surfaces on the roots of jet engine compressor blades and turbine buckets in an automatic cycle. *Ex-Cell-O Corp.*

For free copy circle No. 15 on postcard, p. 87.

Who said, "All Bolts are alike?"



behind the name there's a difference

You may have heard the statement "all bolts are alike" so it doesn't matter where you buy them.

Technically, and from a "standards" standpoint, they should be alike. So why is it that some bolt companies like Lamson & Sessions prosper and continue to grow?

Well, we like to think it's because of certain intangible ingredients that can't be measured, tested or even, in some cases, identified.

Maybe their salesmen are more personable, more helpful and agreeable. Or perhaps the service is better with an obvious "all out" effort to satisfy the customer.

Whatever it is, we *do* know that we make every effort to keep our customers smiling. We try to make it *easy* and *pleasant* for them to do business with us.

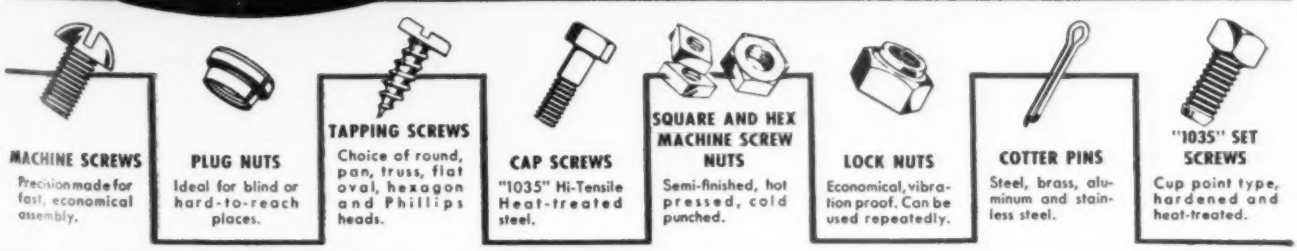
If that's what it takes to make one bolt a better, more attractive buy than another—fine. We think we're on the right track.

That's why we dare say: "All bolts are *not* alike" and we are happy in the thought that our customers share this opinion.

The LAMSON & SESSIONS Co.
1971 West 85th St. • Cleveland 2, Ohio
Plants at Cleveland and Kent, Ohio • Birmingham • Chicago

Lamson + Sessions

FOR PROMPT DELIVERY AND HELPFUL SERVICE, ORDER FROM YOUR LAMSON DISTRIBUTOR



MACHINE SCREWS Precision made for fast, economical assembly.

PLUG NUTS Ideal for blind or hard-to-reach places.

TAPPING SCREWS Choice of round, pan, truss, flat oval, hexagon and Phillips heads.

CAP SCREWS "1035" Hi-Tensile Heat-treated steel.

SQUARE AND HEX MACHINE SCREW NUTS Semi-finished, hot pressed, cold punched.

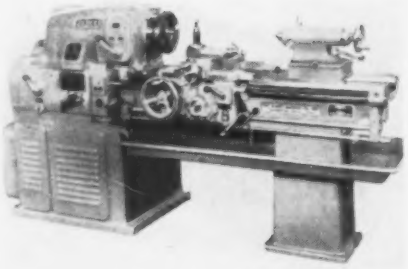
LOCK NUTS Economical, vibration proof. Can be used repeatedly.

COTTER PINS Steel, brass, aluminum and stainless steel.

"1035" SET SCREWS Cup point type, hardened and heat-treated.

NEW EQUIPMENT

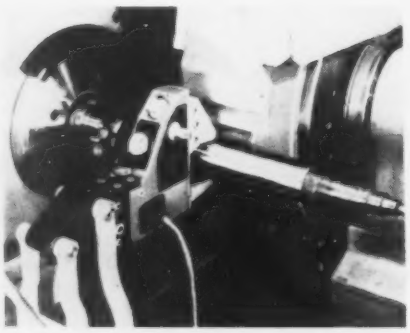
New and improved production ideas, equipment, services and methods described here offer production economies . . . just fill in and mail the postcard on page 87 or 88.



Electronic motor control features precision lathe

The Hendey No. 2E general purpose lathe has infinitely variable spindle speeds with single dial control. Speeds can be changed while machine is under cut. The electronic drive contains only three 18 amp, heavy duty rectifier tubes in the power circuit, and one smaller rectifier tube in the control circuit. Positive, no-slip belt drive is provided between motor and work spindle. Close speed control is achieved even under changing load. The lathe has 14 in. swing. *Hendey Machine Co.*

For more data circle No. 16 on postcard, p. 87.



Cylindrical grinder with automatic sizing control

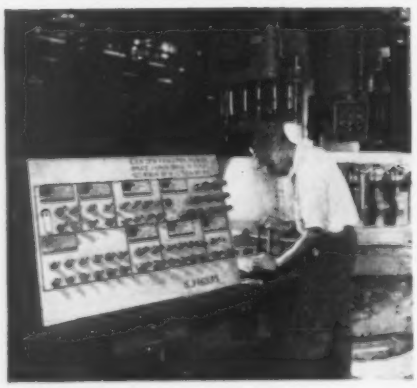
Automatic sizing control of cylindrical grinding operations to a concentricity within 0.000080 in. on long runs is provided in the Schaudt MPS grinder. Automatic sizing cycle which is repetitive for each workpiece in the batch, is initiated by a single main control lever. Sizing control automatically shifts from coarse to fine feed, compensates for thermal expansion and wheel wear during grinding operation, and stops the machine when the predetermined size is reached. Progress of the work cycle can be observed on colored indicator lamps. *Kurt Orban Co., Inc.*

For more data circle No. 17 on postcard, p. 87.

Analytical comparator speeds gear checking

Quick, accurate and low-cost analytical comparison check on production gears is possible with a new analytical comparator. The machine was developed for both large and small volume gear producers to reduce expense and use of floor space. It provides a permanent, easy-to-read record which reveals all variations between a master gear and the production gear being checked. This graphic recording shows true condition of the inspected surface; tells where errors originate while figures show only the magnitude of errors. The principal feature of the machine lies in its combination of all essential gear checks. *Illinois Tool Works.*

For more data circle No. 18 on postcard, p. 87.



Tool board saves setup time, speeds production

This special tool board provides an improved, more efficient system for replacing tools on transfer-type and other multiple spindle machines. With a complete set of 56 newly sharpened drills and reamers ready to replace broken or worn tools instantly, setup time on the Footburt 6-station center column drill was reduced 40 pct; production was increased by 63 additional parts every 8-hr shift. Each cutting tool is graphically identified as to size, station, tool number, and adapter size, contributing valuable human factors to ease setup problems. Standard pre-setting gages simplify and speed accurate setting of tools. Tool boards and benches are designed for user applications. *Scully-Jones & Co.*

For more data circle No. 19 on postcard, p. 87.

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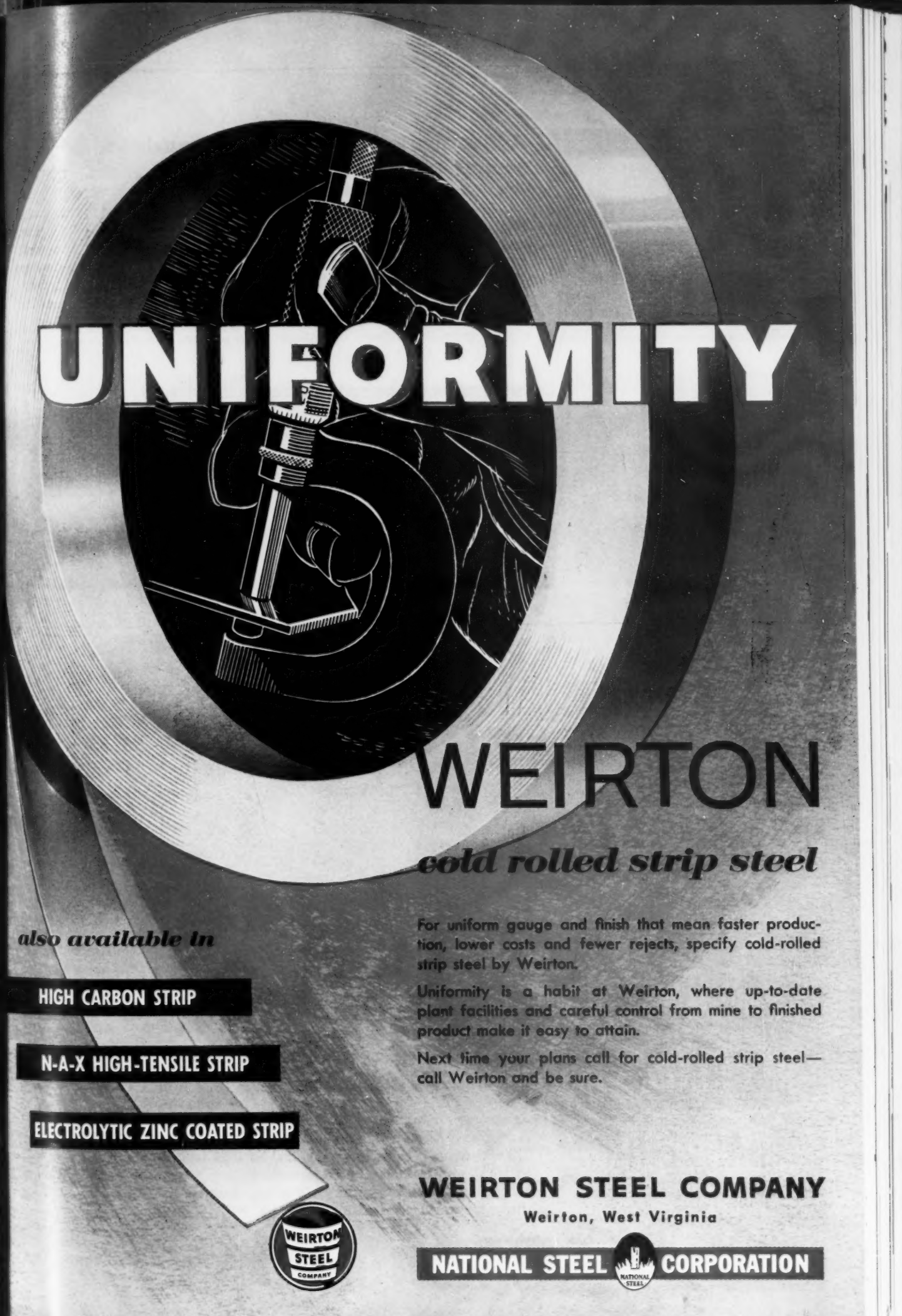
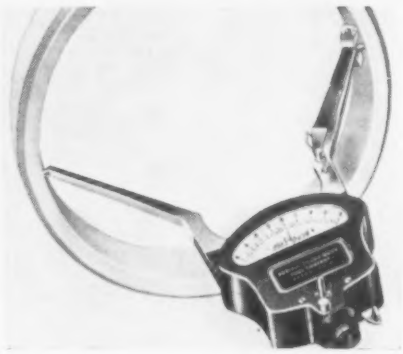

UNIFORMITY
WEIRTON
cold rolled strip steel
For uniform gauge and finish that mean faster production, lower costs and fewer rejects, specify cold-rolled strip steel by Weirton.
Uniformity is a habit at Weirton, where up-to-date plant facilities and careful control from mine to finished product make it easy to attain.
Next time your plans call for cold-rolled strip steel—call Weirton and be sure.
also available in
HIGH CARBON STRIP
N-A-X HIGH-TENSILE STRIP
ELECTROLYTIC ZINC COATED STRIP
WEIRTON STEEL COMPANY
Weirton, West Virginia
NATIONAL STEEL CORPORATION

Aggressive cutting action with maximum safety

New Carboflex depressed center grinding wheels for rough grinding, weld removal, cut-off and slotting operations for ferrous and nonferrous metals and nonmetallics combine aggressive cutting action with extreme high strength and resistance to cracking. The new glass-fiber-reinforced resin bond wheels provide efficient operation with maximum safety. Designed with a knurled back in addition to the knurled face, the wheels enable the operator to cut with both sides, and the periphery of the wheel without any initial dressing. Wheels come in 7 and 9⅛ in. diam; ⅛, 3/16 and ¼ in. thickness. *Carborundum Co.*

For more data circle No. 20 on postcard, p. 87.

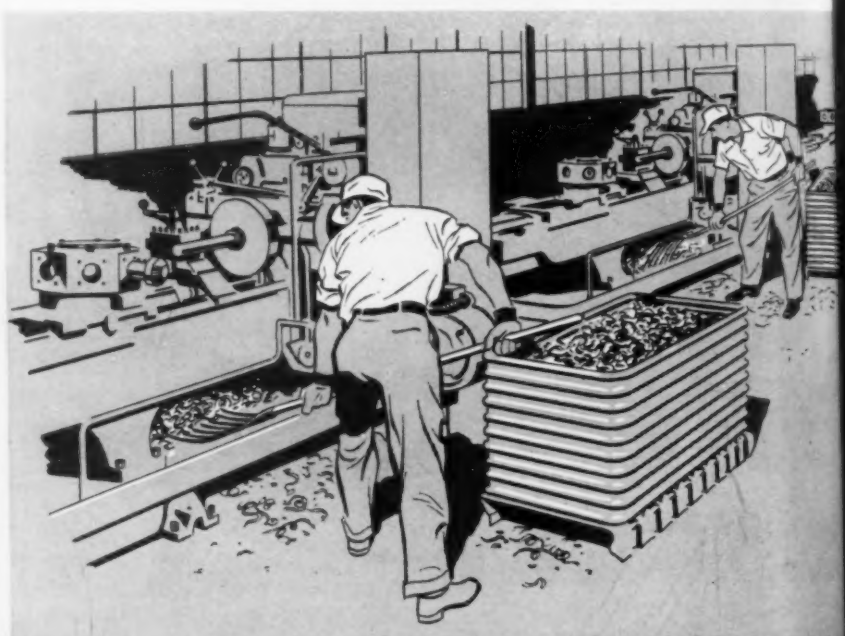


Internal comparator gages ⅜ to 6-in. diameters

The new Interapid internal comparator is used for internal measuring such as internal diameters. Adjustment is made by turning knob in the center of the gage. Initial setting is made with gage blocks, master gage rings or micrometers. A small locking lever provides means of retracting the arms to make it easier for the gaging tips to enter the work being checked. Comparative reading on the meter-type scale shows whether the holes are over or undersize and by exactly how much. Scale is graduated in 0.0005 in. Set includes two sizes of centering arms which snap on and off easily. *Portage Double Quick Tool Co.*

For more data circle No. 21 on postcard, p. 87.

MAY-FRAN



ENGINEERED
SCRAP
HANDLING

ELIMINATES SHUT-DOWNS

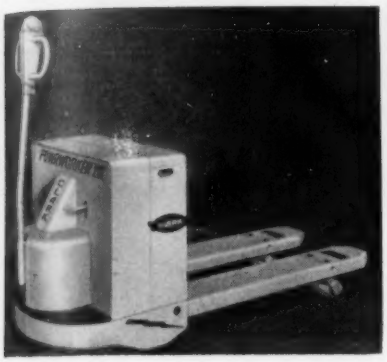
Remove scrap automatically and continuously . . . speed up production . . . with a MAY-FRAN automatic handling system. MAY-FRAN CHIP-TOTES remove chips, turnings and borings from operating machine tools . . . eliminate down-time for manual scrap removal. MAY-FRAN hinged steel belt conveyors then transmit scrap to disposal point or through shearing and baling processes.

1547-MF

Replacement cylinders for plating equipment

A complete line of replacement plating cylinders of H-T Sincolite fits all makes of barrel superstructures, old and new. H-T Sincolite is resistant to acids and alkalies, non-deteriorating and non-contaminating, transparent, lightweight, rugged and lasts indefinitely. The cylinders consist of two heads, 6 heavy-rails and 5 panels, with fusion welded construction throughout (tensile strength of 10,000 psi). They hold their shape permanently without distortion in temperatures up to 200°F; have more holes per sq in. in panels for better, faster plating. *Singleton Co.*

For more data circle No. 22 on postcard, p. 87.



New line of powered hand trucks

Unusual maneuverability, high load stability, operator convenience and simple and quick maintenance are features of new powered hand trucks. The line includes low lift pallet and platform trucks in both 4000 and 6000-lb capacities; telescopic tilting fork trucks in base capacities of 1500, 2000, 2500 and 3000 lb, all at 24-in. center line or 48-in. load length; walk-it-or-ride tractors designed for slow or high speeds. Powrworker 26 trucks can be ridden by the operator. They have shorter overall length, accomplished by reducing the maximum lost length to 26 in. *Clark Equipment Co.*

For more data circle No. 23 on postcard, p. 87.

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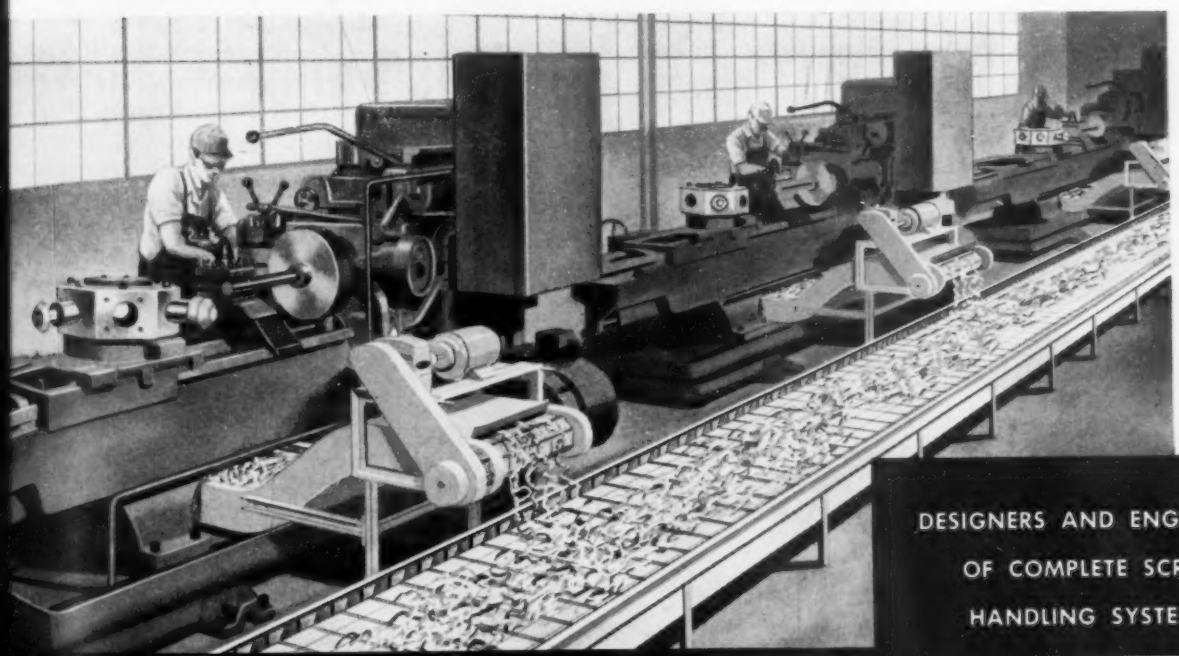


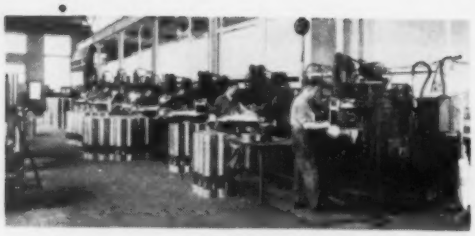
SPEEDS PRODUCTION

Mass produced parts (heavy or abrasive) can be handled through heat treating, machining, inspection and other operations with MAY-FRAN conveyors. Press scrap systems can be made completely automatic. MAY-FRAN engineered handling systems assure outstanding speed and jam-free efficiency with maximum service life. Write today for complete details.

DESIGNERS AND ENGINEERS
OF COMPLETE SCRAP
HANDLING SYSTEMS

MAY-FRAN
ENGINEERING, INC.
1698 CLARKSTONE RD.
Cleveland 12, Ohio

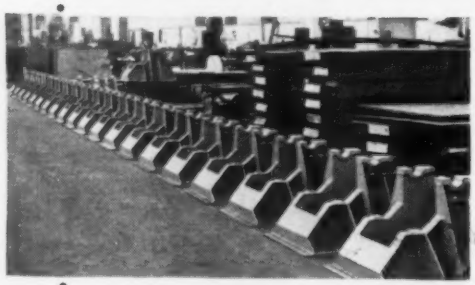
mass produced
if it's weldments you want . . .



Electronically controlled spot welders ranging from 50 K.V.A. to 150 K.V.A.

One of many ten ton precision weldments. Stress relieved. Fabricated from alloy steel plate and forgings.

Production line of armor plate weldments.



heavy or light, in all types of metal . . .

call

BRANDT
OF BALTIMORE

CHARLES T. BRANDT, INC.
Main Plant: Baltimore 30, Maryland
Body Division: 201 N. Haven St.,
Balto. 24, Md.
Address all inquiries to main plant.

FORMINGS • STAMPINGS • WELDMENTS

Vibratory feeder

The bowl feeder, based on the vibrating principle, provides fully automatic, oriented, single line feeding to grinding, packaging, inspecting and many other automatic machines and operations. This feeding device is designed to handle parts that normally could not with-

stand tumbling: finished ground parts, fragile pieces, etc. The manufacturer specializes in selective feeding problems and is prepared to recommend and produce the proper feeding device for each individual application, furnishing in the majority of instances complete tooling down to the work area. *Detroit Power Screwdriver Co.*

For more data circle No. 24 on postcard, p. 87.

Washing compound

New metal cleaning concentrate provides quick, thorough removal of quenching oils after heat treating. The product, Washing Compound 103, is designed for effective removal of oil, grease, lubricants, soils, lapping and drawing compounds. Suitable for both batch and spray type washers, the degreasing agent will produce metallurgically clean work pieces within 3 to 10 min in circulating-type washing equipment. Parts dry bright and clean, without residue. Non-caustic, the compound is mild and will not harm skin or clothing. It will not corrode or etch finished metal parts. *Ipsen Industries, Inc.*

For more data circle No. 25 on postcard, p. 87.

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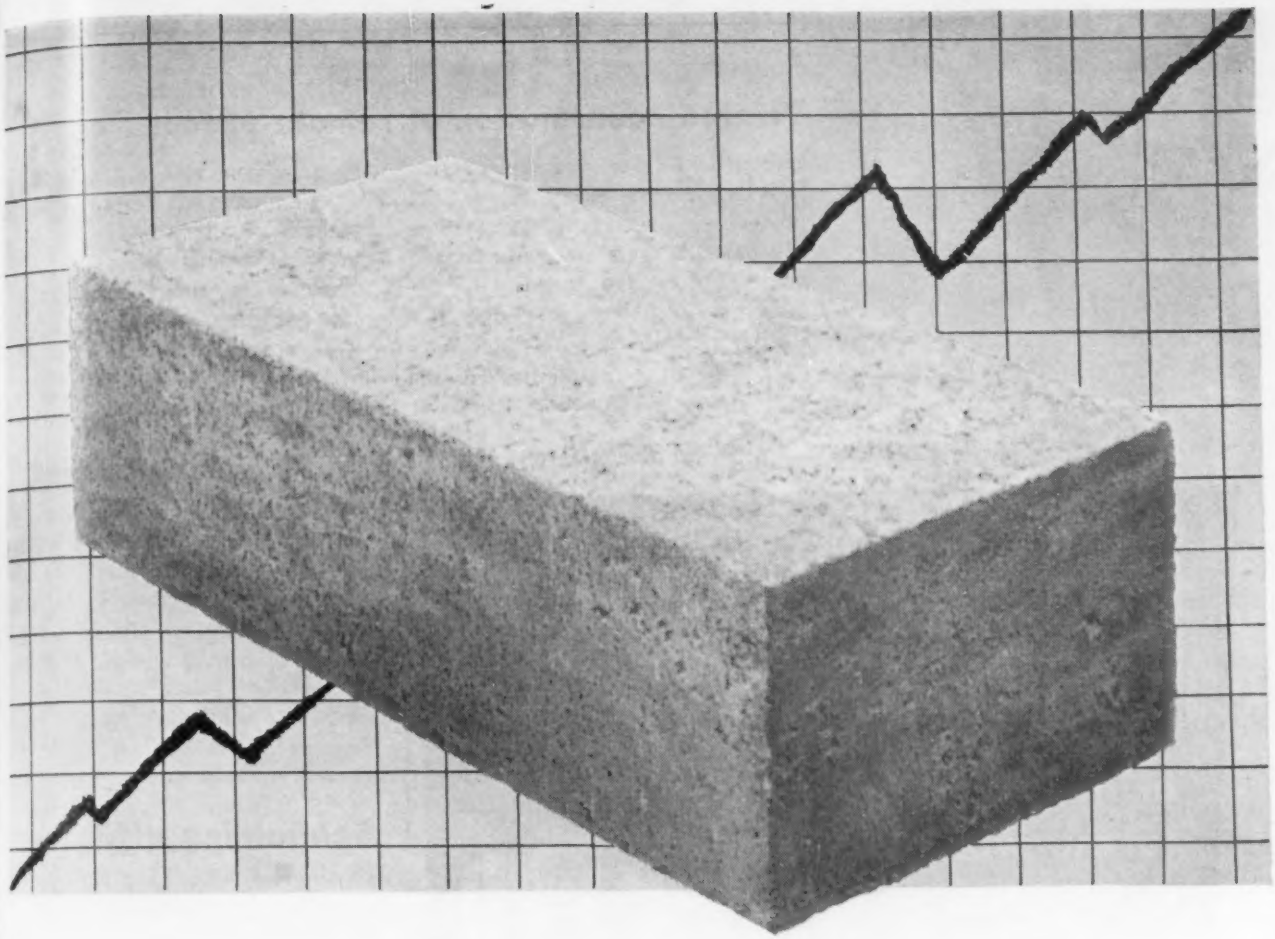


INCREASE YOUR OPEN HEARTH BOTTOM LIFE

WITH PERMANENTE PERICLASE BRICK!

WITH Permanente Periclase "D" burned brick as the subhearth under the Permanente 165 you get *higher MgO per unit volume than possible with any other refractories available today.*

Permanente Periclase "D" bricks provide 9.43 lbs. of MgO per 9" equivalent, plus *maximum* density with absence of connected voids. Used in combination with Permanente 165 you are sure of the ultimate in bottom safety and durability.

Many of the nation's largest steel producers rely on Permanente Periclase Bricks for these quality advantages:

Pre-shrunk, accurately-sized periclase grains derived from seawater magnesia • Ceramic bond achieved through solid phase reaction • Absence of liquids at operating temperatures • High refractoriness • Maximum density; absence of connected voids • Excellent volume stability.

Permanente Periclase Brick for the Steel Industry:

PD-B (Periclase "D" burned) brick for open hearth and electric furnace bottoms. Low in iron, lime and silica. Chrome free. Maximum MgO in bottom.

PCA, PCA-MC (Periclase-Chrome "A"), plain and metal-encased for open hearth end walls, front walls and uptakes. Metal-encased for electric furnace sidewalls. High in MgO. Outstanding all-purpose refractory.

CPA-B (Chrome-Periclase "A," burned) for open hearth front and back walls. Controlled chrome additives result in highest resistance to spalling.

CPA-MC (Chrome-Periclase "A"), metal-encased for open hearth back walls, front walls. High hot load strength.

Installation advice on request

Producers of the most complete line of basic refractories

Castables and Mortars • Magnesite • Periclase • Deadburned Dolomite

•

Printed confirmation of remote procedures

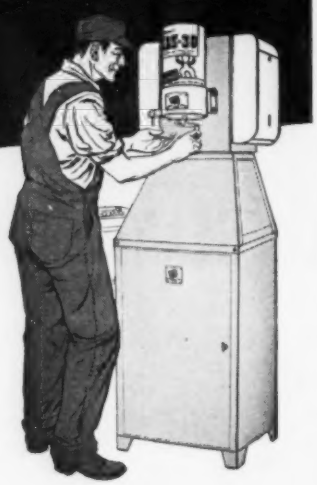
The model CSR master time printer provides a time record of remote procedures, actions or methods. Whenever a pair of contacts are made at a remote station, the instrument registers corresponding station symbol with the exact time and date on a standard 2¼ in. paper tape. It has a capacity of 30 stations, and will automatically accept, monitor and record all station information regardless of simultaneous station operation or sequence. The time printer consists of a recorder unit and relay unit. It is adaptable for shelf or table. *Cincinnati Time Recorder Co.*

For more data circle No. 26 on postcard, p. 87.

NEW SBS WATERLESS WASHSTATION*

"brings the washroom to the worker"*

for only $52.50 per unit
(F.O.B. Saginaw, Mich. Towel Dispensers not included)



SBS Waterless Washstations are complete units for hand washing on the job. Because they dispense SBS-30 Waterless Skin Cleanser, these Washstations require no plumbing . . . SBS-30 is simply rubbed on the hands and wiped off along with all the soil.

SBS Waterless Washstations—

- **In Trouble Spots** — Avoids workers use of irritating, harmful solvents. Quickly and safely removes tars, greases, paints, varnishes and other hard-to-remove soils.
- **On the Production Line** — Cuts to a minimum costly interruptions for hand washing.
- **Actually Earn You Money** — By eliminating one unnecessary trip per day for hand washing by only 10 men, you can save up to $720 annually.

Fill out and mail coupon below for complete information about SBS Waterless Washstations and our 30-day no-risk money back trial offer.

SUGAR BEET PRODUCTS CO. • Saginaw, Mich.
Chemical By-Products Division

MAIL TODAY - GET THE FACTS!

SUGAR BEET PRODUCTS CO., Dept. BA, SAGINAW, MICHIGAN
Sirs: Please send me full information about the new SBS Waterless Washstation and your 30 day no-risk money back trial offer.

NAME_____
TITLE_____
COMPANY_____
CITY_____ ZONE_____ STATE_____

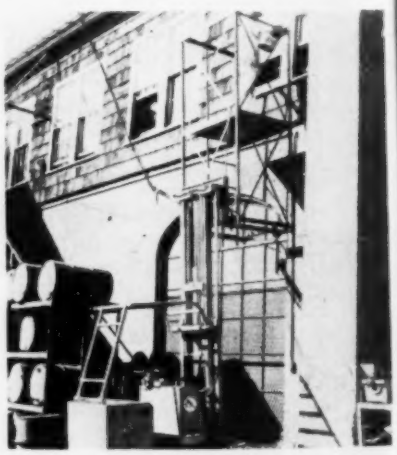
Anti-seize compound

Coppermol anti-seize compound for extrusion nozzles is easily applied, and serviceable at sustained temperatures up to 1500°F. It forms continuous film of colloidal copper and molybdenum sulfide, effectively preventing mating seizures of closely machined threads. *Surveys Inc.*

For more data circle No. 27 on postcard, p. 87.

Scaffolding attachment

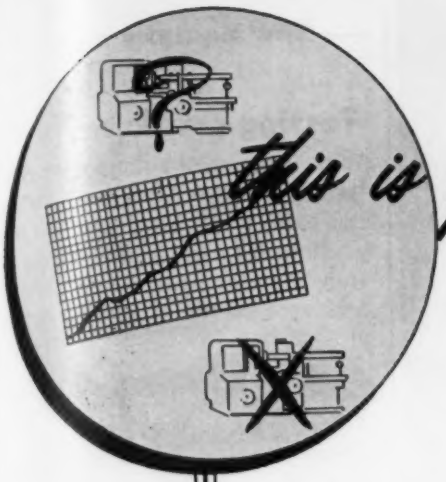
Plant maintenance is facilitated by a scaffolding attachment to be used on L-S electric fork trucks. The attachment can be used for both inside and outside repairs and for hard-to-reach trouble spots. The lift truck's forks slide into sleeves on the underside of the scaffold



holding it securely. A built-in ladder on one side of the structure makes it easy to reach the platform when forks are down. High guard provides safety for the operator. With lifting and lowering remote control, the man can raise and lower himself as desired. *Lewis-Shepard.*

For more data circle No. 28 on postcard, p. 87.

Turn Page



this is your problem in 1954!

Industry is now planning the rejuvenation of its manufacturing processes and equipment for the competitive era ahead.*

It's a time-consuming job.

How can it be *speeded up* for you?

***see the 1953 ASTE Obsolescence Report.*

what ASTE is doing to help you

The American Society of Tool Engineers is assembling in Philadelphia's Convention Center on April 26 to 30 inclusive the latest in production equipment and processes available from over 450 manufacturers. The exhibits will be open to you and your key men during these five days, from 9:00 A.M. to 5:00 P.M. Included will be inspection and automation devices, machine tools, accessories, cutting tools, and allied equipment.

Simultaneously, a series of top-level Conferences will be held dealing with such major industrial problems as Plant Management, Automation, Precision Control, Metal Forming, and Assembly Methods.

it's up to your key men NOW!

. . . whether your company moves forward or falls behind in the competitive era ahead. To help you select the key men in your organization who definitely should visit the Exposition, the ASTE has prepared a "plan booklet" which covers every aspect of the ASTE Exposition and Conferences. Write today for a copy on your company letterhead. It will be mailed to you promptly, free of charge.

Available on request to all industrial executives.

This advertisement is sponsored by the 27,600 Members of

THE AMERICAN SOCIETY OF TOOL ENGINEERS

10700 Puritan Avenue — Detroit 38, Michigan

How to stay ahead of your competition with Townsend special fasteners and parts

In today's highly competitive markets many design engineers and production managers find they improve products, reduce material costs and assembly time with Townsend's method of cold-forming fasteners and small parts. It enables them to put greater value into their products and at the same time hold unit costs down.

The Townsend method often replaces costly, material-wasting methods with savings that range from $.70 to $80.00 per thousand. Annual savings are often substantial—$15,816 on an automobile door lock part—$12,000 on a washing machine fastener—$11,190 on two parts for home laundry equipment—$15,630 on two refrigerator fasteners—$5,130 on an electrical connection.

Townsend engineers specialize in the assembly and fastening of all types of materials for all industry. They draw upon more than 10,000 standard and special items developed in 138 years of cold-forming experience and rely upon Townsend's capacity to produce 60-million pieces daily to give you the best in fastening methods. To learn how to improve fastening efficiency, ask to have an engineer call.

Townsend

COMPANY • ESTABLISHED 1816

NEW BRIGHTON, PENNSYLVANIA

Sales Offices in Principal Cities

Cherry Rivet Division • Santa Ana, California

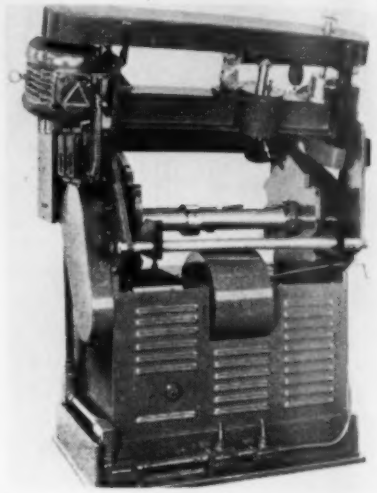
THE FASTENING AUTHORITY—Experience: *over 138 years*—**Capacity:** *sixty-million parts daily*–**Products:** *over ten-thousand types of solid rivets–cold-headed parts–Cherry Blind Rivets–Twinfast Screws–self-tapping screws–tubular rivets–locknuts–special nails–formed wire parts.*

Plants: *New Brighton, Pa.—Chicago, Ill.—Plymouth, Mich.—Santa Ana, Calif.*

In Canada: *Parmenter & Bulloch Manufacturing Company, Ltd., Gananoque, Ontario*

Testing crankshafts

With this semi-automatic Brinell testing machine, testing operations are said to require only half the previous labor force, as it automatically indexes test pieces through both spot grinding and Brinell test-

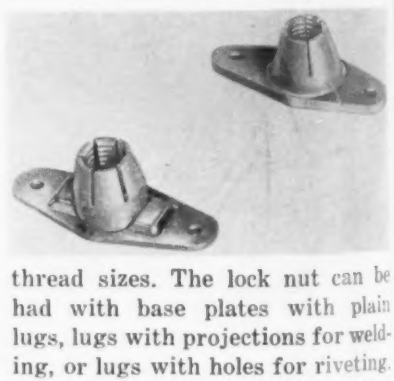


ing stations. At the rate of 400 pieces per hr, crankshafts, gun barrels, or other shaft-like parts, are fed into the machine. They slide out, ready for inspection. Model RCB has a 30-in. work opening, and is hydraulically operated. *Detroit Testing Machine Co.*

For more data circle No. 29 on postcard, p. 87.

Weld nut

New lightweight, high-temperature, two-lug anchor lock nut is up to 45 pct lighter than previous designs, easier to weld, and requires 75 pct less critical materials. Designed for service to 1200°F, the ZA1W1200 is available in 8-32, 10-32 and ¼-28



thread sizes. The lock nut can be had with base plates with plain lugs, lugs with projections for welding, or lugs with holes for riveting. It is functionally and dimensionally interchangeable with ZA1-1200 nuts. *Elastic Stop Nut Corp. of America.*

For more data circle No. 30 on postcard, p. 87.

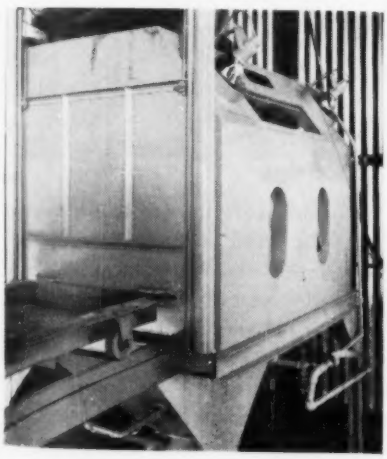
Roofing, siding

New aluminum roofing and siding product is said to reduce by 50 pct the amount of metal normally used in side laps with conventional metal sheets. This 8-V crimp roofing and siding also makes possible savings in time, labor and installation costs. The product is available in 0.019 in. and 0.024 in. sheets. Both gages are embossed for greater beauty and rigidity; are available in all standard lengths from 6 to 12 ft, in 1-ft increments. *Reynolds Metals Co.*

For more data circle No. 31 on postcard, p. 87.

Wet blast cabinets

No rotary pump is used in the Belmont wet blast cabinets designed to remove surface contamination and polish with a water suspension of fine abrasive. Agitation of the slurry is provided with Whirlpool



device. An air ejector pump with no moving parts draws liquid from the top surface and shoots it, tangentially, into the circular sump, creating whirlpool, with complete agitation. An efficient blasting gun throws more slurry at a higher speed, and cleans faster than conventional suction guns, it is stated. Lightweight trigger operated gun gives instant control with a comfortable pistol grip. Good ventilation and lighting provide high level of illumination. Abrasive ranges from 50 to 2000 mesh, nonmetallic. *Vacu-Blast Co., Inc.*

For more data circle No. 32 on postcard, p. 87.

Turn Page

Here's free information to help you reduce material and assembly costs

If you assemble metal, wood, plastics, fabrics or glass, here is a wealth of free information which shows how to increase efficiency and improve products with Townsend fasteners. These bulletins describe a few of the 10,000 special and standard items now being used by all industry to reduce material and assembly costs.

Manufacturers of appliances, radio and TV sets, automobiles, aircraft, electrical equipment, farm implements, railroad rolling stock—even toys, rely upon Townsend as "The Fastening Authority" to help them fasten materials together quickly—economically—permanently. The bulletins listed below are yours for the asking.

- **Special Cold Formed Fasteners and Small Parts** explains the economy of cold-forming small parts and how to enjoy the advantages of Townsend's design service. Bulletin TL-89
- **Townsend Tapping Screws** describes seven types of tapping screws used for economical, quick, secure fastening of sheet metal, casting, forgings, plastics, plywood and composition materials. Bulletin TL-88
- **Townsend Locknuts** gives data on positive resistance to vibration and shock with Tufflok and Nylok locknuts which provide tight grip through use of special locking inserts. Bulletin TL-63
- **Cherry Blind Rivets** shows how this ingenious rivet is used by one man, from one side of the work to rivet "blind" in double-surfaced structures, box sections, tubes and ducts. Bulletin TL-76
- **TWINfast Wood Screws** explains how the two threads and double thread pitch cut driving time, increase holding power in wood-to-wood, wood-to-plastics and metal-to-wood applications. Bulletin TL-67
- **Place Bolts** describes this slotted-type, one-piece, all-metal, reusable locking bolt and how it offers cost savings in vibration fastening. Bulletin TL-73.

Townsend

COMPANY • ESTABLISHED 1816

NEW BRIGHTON, PENNSYLVANIA

Sales Offices in Principal Cities

Cherry Rivet Division • Santa Ana, California

Use coupon below or write

TOWNSEND COMPANY • SALES DEPARTMENT • NEW BRIGHTON, PA.

Please send to me without obligation bulletins circled below:

TL-89 TL-88 TL-63

TL-76 TL-67 TL-73

Name_____ Title_____

Company_____

Street_____

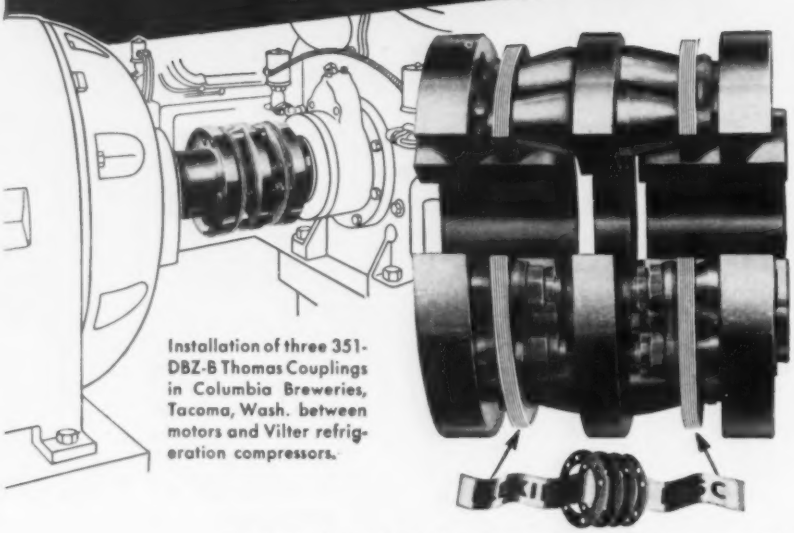
City_____ Zone_____ State_____

Instrument unscrambles metal mix-ups

Non-destructive testing and sorting of accidentally mixed or incorrectly processed metal parts can be done speedily by the new Model C-1 Cyclograph. The instrument can be used on either ferrous or nonferrous metals and will sort raw stock, semi-finished, or finished parts by their metallurgical characteristics such as analysis, hardness, structure, case depth, etc. With a known and acceptable part used as a standard in adjusting the instrument, unwanted parts are quickly separated from the good ones. The Cyclograph can be a hand sorter or can be used in conjunction with an automatic relay. *J. W. Dice Co.*

For more data circle No. 33 on postcard, p. 87.

THOMAS FLEXIBLE COUPLINGS...
for more years of better service!

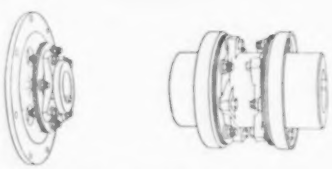


Installation of three 351-DBZ-B Thomas Couplings in Columbia Breweries, Tacoma, Wash. between motors and Vilter refrigeration compressors.

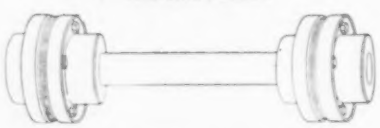
Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

DISTINCTIVE ADVANTAGES

FACTS	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating.
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.



THOMAS COUPLINGS ARE MADE FOR A WIDE RANGE OF SPEEDS, HORSEPOWER AND SHAFT SIZES.



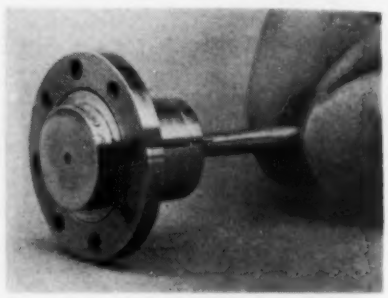
Write for our new Engineering Catalog No. 51A

THOMAS

THOMAS FLEXIBLE COUPLING COMPANY
Largest Exclusive Coupling Manufacturer in the World
WARREN, PENNSYLVANIA, U.S.A.

Pressure pickup

Where pressure transients occur too rapidly for observation with conventional indicating devices, the new electrical resistance-Type 4-312 Pressure Pickup provides immediate response to pressure changes.



This miniature is available in gage, absolute, and differential models which feature high corrosion resistance and a flush-type diaphragm. It may be used for liquid or gaseous measurements. *Consolidated Engineering Corp.*

For more data circle No. 34 on postcard, p. 87.

Metal protection

Four basic types of applications are recommended for Barcote 600, a new leaded petroleum compound for the protection of metal surfaces against corrosion: corrosion protection of structural steel and sheet metal; protection of rails, and rail joints; lubrication of wire rope; and protection of metal parts in storage. It is applied by brush or air spray. A solvent, cut back, leaded compound, it provides coverage with a thin film which sets to a semi-hard coating of pure lubricant, with adhesion and penetration of all metals. *Brooks Oil Co.*

For more data circle No. 35 on postcard, p. 87.

The Iron Age

SALUTES

Rush A. Lincoln

This distinguished metallurgist sets no limits to his personal or professional accomplishments

RUSH LINCOLN will be amazed to learn that he amazes his friends. But it's true. Some of them have permanently raised eyebrows from continual uncovering of hitherto unknown facets of his personality.

At Allegheny Ludlum Steel Corp., where Rush is chief metallurgist, mention of his name touches off a rash of stories about his accomplishments.

For instance, he learned enough about structural engineering—a subject far removed from metallurgy—in a year of reading to co-author a book with Michael Watter. The title: *The Strength of Stainless Steel Structural Members as a Function of Design.*

Like President Eisenhower, Rush is a painter, does a workmanlike job in oils. When he decided to learn something about business management he sent away for an entire correspondence course, read it in record time. His friends also warn the unsuspecting to avoid arguments with him on theology—he's studied that, too.

For relaxation, Rush turns to music—serious music. And the basement of his home contains an up-to-the-minute woodworking shop to satisfy the urge to work with his hands.

Rush joined Allegheny Ludlum's research lab in 1935 after four years as a Teaching Fellow at Carnegie Tech. Before that he was a Research Fellow in a cooperative program between Bureau of Mines and Tech on the physical chemistry of steelmaking.

Rush was A-L's associate director of research on stainless steel from 1940 to 1945, then shifted to Sales Development & Engineering Service until 1953 when he was appointed chief metallurgist. He knows the problems of steel fabricators as well as his own name and is now applying that knowledge to mill practice.

Rush is 47, a native of Richmond, Va. Besides Carnegie Tech, where he obtained his MS. and D.Sc. degrees, his schools include University of Richmond and Virginia Polytechnic Institute.

WICKWIRE WIRE

puts the ease in your easy chair

To be truly comfortable the upholstery in a chair or couch must have the right kind of springs formed from the right kind of wire.

Wickwire Gamma Spring Wire—specially processed for upholstery use—has won outstanding preference in this service because manufacturers have found they can always depend upon it for long-lasting retention of resiliency and shape.

Here's just one more example of the wide diversity of application embraced within the complete range of Wickwire Wire. Let us know your requirements in any specialty steel wire. We are prepared to meet your most exacting specifications for wire of high or low carbon steel—round or shaped—in all tempers, finishes and grades.

for the wire you require—check first with Wickwire

THE COLORADO FUEL AND IRON CORPORATION—Denver and Oakland

WICKWIRE SPENCER STEEL DIVISION—Atlanta • Boston • Buffalo • Chicago
Detroit • New Orleans • New York • Philadelphia

2055

WICKWIRE WIRE

CF&I PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

The Iron Age

INTRODUCES

Frederick O. Detweiler, elected president, CHANCE VOUGHT AIRCRAFT, INC., Dallas; and **H. B. Sallada,** elected vice-president.

Robert E. Leoni, elected president, WM. H. MULLER & CO., INC., New York.

W. J. Ulrich, elected vice-president, THE CARBORUNDUM CO., Niagara Falls, N. Y.

L. Paul Gilmore, elected vice-president, treasurer and controller, THE AUSTIN CO., Cleveland.

Eugene H. Tegtmeier, promoted to vice-president in charge of sales, TEMPEL MFG. CO.; and **Fred A. Slaughter,** named sales manager.

Dudley J. Brown, appointed executive assistant of sales, THE LAMSON & SESSIONS CO., Cleveland; **Thomas B. Judd,** promoted to manager of aircraft sales; and **A. H. Schaefer,** made price co-ordinator.

H. H. Richardson and **Dana T. Bartholomew,** elected to the board of directors ALUMINUM LTD., Montreal.

Carl D. Bowers, appointed assistant director of safety, KAISER STEEL CORP., Fontana; and **Evon W. Holbrook,** appointed assistant to the purchasing agent.

E. P. Additon, appointed sales engineer, Mid-Atlantic District, BLAW-KNOX CO., Chemical Plants Div., Pittsburgh.

S. Straus, becomes manager of sales promotion, METTLER MACHINE TOOL, INC., for Shuster automatic wire straightening and cut-off machines.

Albert E. Boot, appointed carbide service engineer, Mid-Eastern District, FIRTH STERLING INC., Pittsburgh.

W. M. Trigg, named manager of WESTINGHOUSE ELECTRIC CORP., Blairsville, Pa.

James C. Hebert, appointed manager of Machine Tool Div., JONES & LAMSON; and **Frank E. Cheever,** appointed manager of engineering.

Walter Johnson, appointed manager, Canton Forge Plant, FORD MOTOR CO., Dearborn, Mich.

John H. Van Moss, becomes sales consultant, Western Territory, AMERICAN CAR & FOUNDRY CO., New York.

Jack M. Esten, appointed abrasive engineer, NORTON CO., Worcester, Mass.; and **Robert C. Divoll,** named a field engineer.

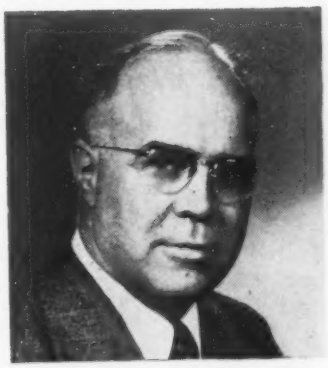
J. D. McCall, appointed assistant general manager, Operations, U. S. STEEL CORP., San Francisco; and **Donald E. Rice,** appointed general superintendent, Pittsburgh Works.

Louis H. Lundstedt, promoted to sales manager, Catalog Line, THE CLEVELAND HARDWARE & FORGING CO., Cleveland.

John A. Vanyo, Jr., named assistant sales manager, COPES-VULCAN DIV., Continental Foundry & Machine Co., Erie, Pa.

Nicholas F. Pensiero, named head, New Products and Market Research Div., OXY-CATALYST, INC., Wayne, Pa.

KEMPTON DUNN, elected president, American Brake Shoe Co., New York.



EVAN W. McNEILL, appointed vice-president, Ohio Seamless Tube Div., Shelby, Ohio, Copperweld Steel Co.

CHARLES C. GALLICANO, appointed assistant to the president, American Car & Foundry Co., New York.

Louis F. Manneschmidt, appointed Eastern division manager, TRAILMOBILE INC., Cincinnati, **J. J. Mooney,** named assistant branch manager, Philadelphia; and **Paul Campbell,** appointed branch manager, Baltimore.

Richard R. Russell, appointed sales engineer, THE UDYLITE CORP., Atlanta office.

C. D. Tucker, named production superintendent, Bay City Div., THE DOW CHEMICAL CO., Midland, Mich.; and **C. E. Lehnhardt,** named product sales manager for magnesium fabrications.

John C. Ketterer, named assistant superintendent of operations, MACKINTOSH-HEMPHILL CO., Pittsburgh.

Don Allshouse, appointed general advertising manager, CONTINENTAL FOUNDRY & MACHINE CO., Chicago.

Harry W. Crank, appointed tank-trailer sales manager, TRAILMOBILE INC., Cincinnati.

R. E. O'Neill, appointed general manager of sales, ATLANTIC STEEL CO., Atlanta; and **R. H. Prater,** named traffic manager.

Weaver E. Falberg, appointed assistant general manager of sales, of the nation-wide group of sixteen steel service plants, JOSEPH T. RYERSON & SON, INC., Chicago; and **Roland W. Burt,** appointed manager, Chicago plant. **Alfred J. Olson,** becomes sales manager.

A. L. Geisinger, named general manager, new plastics Div., DIAMOND ALKALI CO.; and **C. E. Lyon,** becomes general manager new Chlorinated Products Div.

Ernest Derr, appointed to customer service, Houston plant, THE ATLAS MINERAL PRODUCTS CO.; and **Walter Goethe,** named to development, Thermoplastics Structures Div.

Harry T. Zimmer, appointed chief of production control and industrial engineering, OLIVER IRON & STEEL CORP.

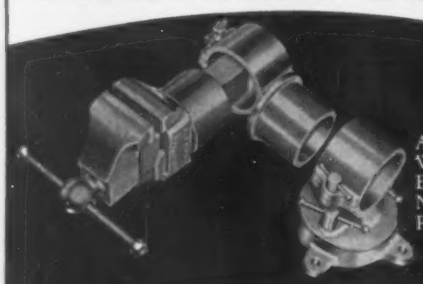
S. B. WITHINGTON, named president, Lycoming Div., Avco Manufacturing Corp.

FRED F. ROEHLL, named vice-president-Sales, Eutectic Welding Alloys Corp.

HOWARD M. PALMER, appointed sales vice-president, Lewis-Shepard Products Inc.

LOREN J. WESTHAVER, appointed general manager of operations,— Columbia-Geneva Steel Div., U. S. Steel Corp.

Cut Production Time and Costs



A Production Worker on the Bench Who is Never on Your Payroll!

with

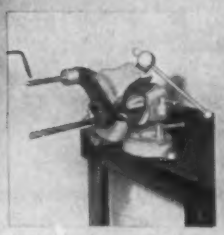
FLEXIVISE

A revolutionary development that saves time, labor and fatigue. Provides complete rotation of 360° in any direction. Positions work to the operator, saving time, labor and physical fatigue. Flexivise is exactly what the name implies; a flexible vise providing a greater range and greater efficiency. 4" jaw width, 5½" jaw opening. Write or wire now for complete information.

FLEXIVISE COMPANY

1149 E. Pico Blvd., Los Angeles, Calif.

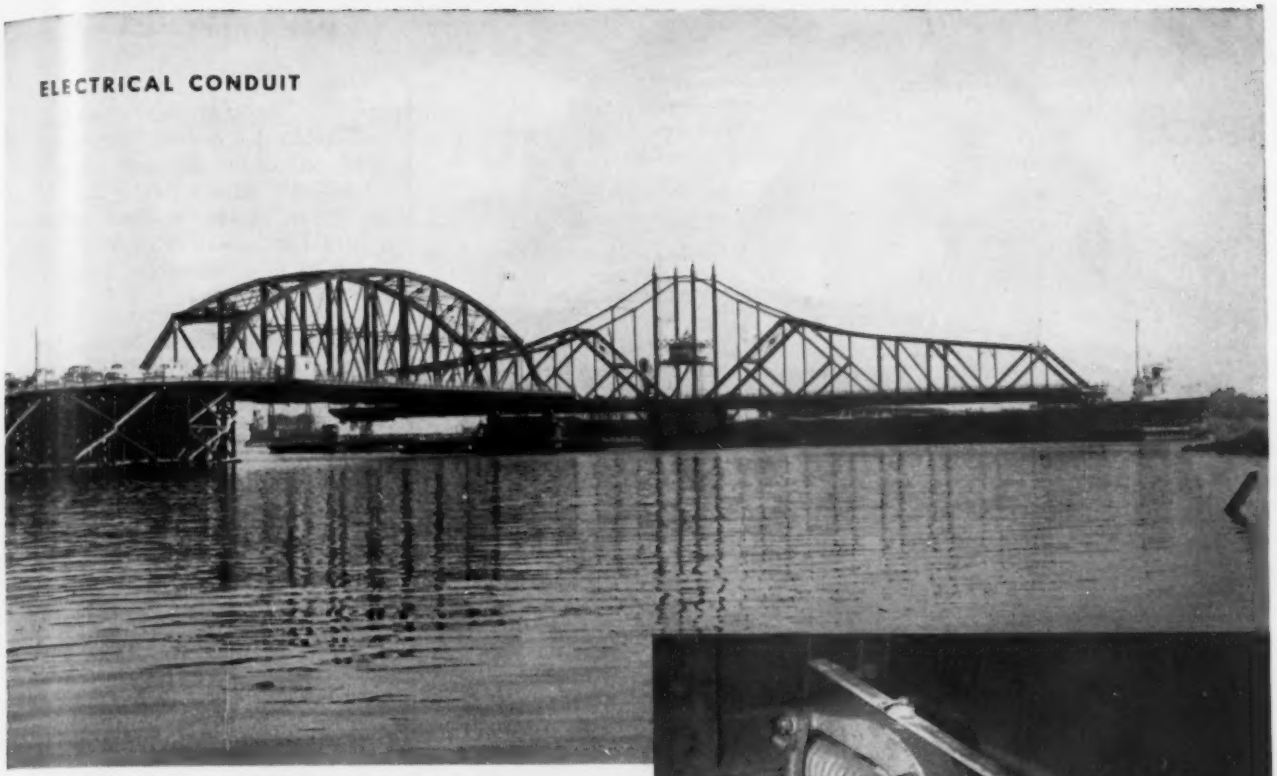
Special FlexiSleeve provides a vertical rotation.



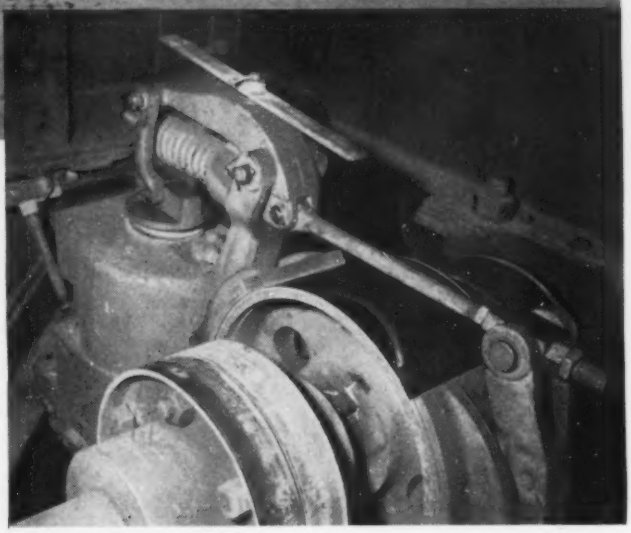
Work can be rotated a full 360° and locked in any position.

Large unwieldly pieces can be held securely by Flexivise.

ELECTRICAL CONDUIT



DULUTH-SUPERIOR BRIDGE opens from 15 to 50 times daily in the iron ore shipping season to let ore boats through. Wiring for lighting, protected by 1500 feet of Everdur Electrical Conduit, is installed under the deck.



HERE EVERDUR CONDUIT protects wiring to electric brakes on bridge motor. It is also used for power lines to emergency generator, and on lines serving strip heaters in power house.

Everdur passes long test on Duluth-Superior span

One job Everdur* Electrical Conduit does on the Duluth-Superior Bridge is protect electric light lines. Heavy rain and snow driven by 60 to 70 mile-an-hour winds often pound at this conduit. Heat and cold do their worst. It is exposed to acid fumes from ore boats and rail traffic. Vibration from opening and closing of the bridge, and constant traffic, is a daily threat. Yet recent inspection shows the Everdur Rigid Conduit still in excellent condition. Not a sign of wear, rust or corrosion!

Everdur Electrical Conduit is made of Everdur Copper-Silicon Alloy in two wall thicknesses (R.C. and E.M.T.). For additional information about this Anaconda Product, write to: *The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont.*

*Reg. U. S. Pat. Off. 53150

***wherever corrosion resistance counts*—EVERDUR ELECTRICAL CONDUIT**

an ANACONDA® product

in Perkins custom-made Gears

We have manufactured precision gears to customers' specifications for over thirty years. This collective experience enables us to approach any gear engineering problem with a vast amount of "hindsight." For no matter how exacting your particular requirements may be, they cannot exceed those of many of our regular customers. The return of a buyer's market places a premium on quality. And if — in the product you manufacture, quality is synonymous with trouble-free power transmission — our gear engineering service will be of great value to you right now. Ask us for suggestions, ideas and cost estimates today.

PERKINS MAKES: helical gears, bevel gears, sprockets, ratchets, worm gears, spiral gears, spur gears with shaved or ground teeth, ground thread worms.

NOTE 1: A new product is the **Perkins Precision Spring Coiler.** This coiler (patent applied for) turns out precision springs — any type, shape, size, from wire sizes .005 to .125.

2: Another new product — the **Perkins "Bendit 15"** — a patented metal forming machine bends and shapes sheets, rods; strips tubing into innumerable complex as well as simple forms that would be difficult or impossible to make by other means. Eliminates need for expensive tools or specialized skills. Ht. 47", net wt. 200 lbs. Write today for descriptive catalogs, prices etc.

PERKINS Machine & Gear Co.
WEST SPRINGFIELD, MASSACHUSETTS

—Personnel—

Continued

Harold A. Wever, promoted to field salesman, Chicago, HOOKER ELECTROCHEMICAL CO.; **Julian J. Boyce,** made a field salesman, Philadelphia; and **Ernest F. Blew,** becomes field salesman, New York.

Beresford N. Clarke, assigned to Ft. Wayne Office, SURFACE COMBUSTION CORP., Toledo; and **Hugh W. McIntyre,** appointed to the Detroit industrial sales office.

James B. Pitzer, Jr., appointed chief inspector, TEMCO AIRCRAFT CORP., Greenville, Tex. plant.

Kenneth A. Ayers, appointed district manager, Washington, D. C. office, BALDWIN-LIMA-HAMILTON CORP., Philadelphia.

A. G. Ricketts, transferred to Oakland, Calif. plant, ROCKWELL MFG. CO.

Phillip D. Freeman, becomes sales representative, St. Paul, Minn. sales office, THE TRANE CO.; **Richard E. Jameson,** joins the Des Moines sales office; and **Dennis W. Nelson** joins Billings, Montana sales office.

OBITUARIES

Frederick S. Glover, Sr., 74, former president of the Timken-Detroit Axle Co.

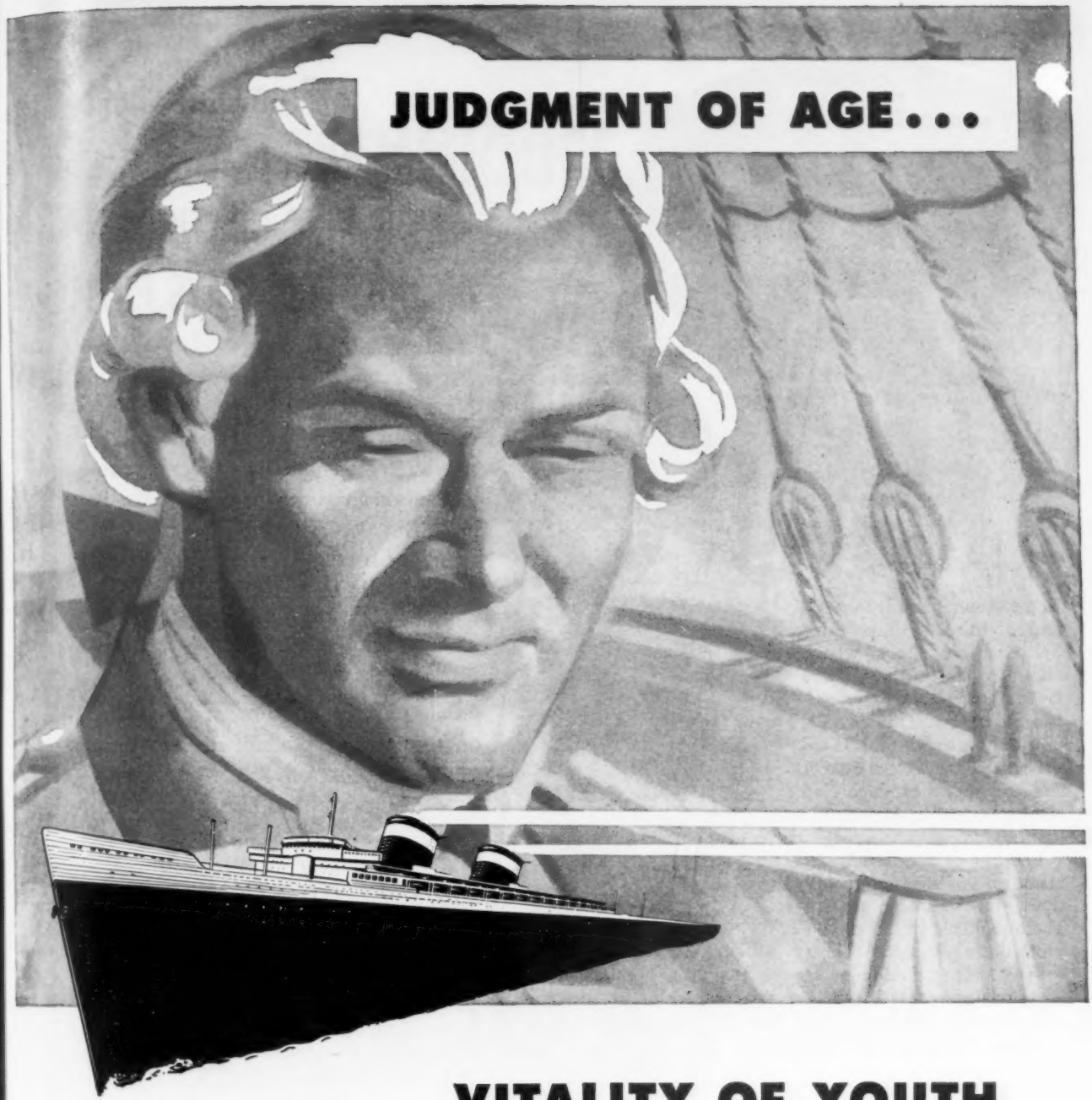
Reginald H. Hargrove, 57, president, Texas Eastern Transmission Corp., in plane crash recently.

William Donald, 74, retired, former comptroller of Carnegie-Illinois Steel Co., recently in Pittsburgh.

Allen G. Pike, 50, sales representative for Texas Electric Steel Casting Co., Houston, Texas, recently in Houston hospital after an illness.

Alfred V. Mathews, 60, assistant manager of the Hercules Powder Co., plant in Birmingham, Ala., recently in a Birmingham hospital.

Charles O. Burgess, 50, internationally known metallurgist and technical director, Gray Iron Founders' Society at his home in Cleveland.



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INLAND **TI-CO®** GALVANIZED SHEETS WITH THE ZINC COATING THAT ROLLS WITH THE PUNCH

NEW TECHNIQUES Shorten Investment Casting Cycle

By W. G. Patton
Asst. Technical Editor

◆ Development of a new precoating material that successfully resists heat shock, and the use of plastic patterns and centrifugal casting have greatly reduced the time cycle for ferrous investment castings.

◆ Low equipment costs plus high output per worker make the short cycle process competitive with other methods used to produce small parts of intricate shapes.

◆ The full range of ferrous and nonferrous metals, including high temperature alloys, have been cast using these new techniques . . . Through use of induction heating, steel heats to 5 lb can be poured in 5 min, starting cold.

◆ A SHORT CYCLE investment casting process that offers all the advantages of the lost wax process plus relatively high production per man-hour has been developed for production of precision castings. During the past 6 months W. H. Anderson Co., Detroit, has brought the process from pilot to production stages.

Substitution of plastic for wax patterns not only simplifies handling but improves accuracy and shortens the time required to tree small parts or mount the patterns on a button. Time required to dry the investment material has been reduced from 12 hours or more to as little as 4 hours. From the time the sprueing operation is started until the casting is poured, no more than 6 hours is required.

By combining a fast processing cycle with high production per square foot of floor space, a minimum investment in equipment and comparatively large output per man-hour, the company expects to improve its competitive position not only in the investment casting field but also against competitive processes making small intricate parts that cannot be machined.

Other advantages of the process include:

1. Ability to cast thin wall castings of intricate shape, while holding dimensions within 0.005 in. or less.

2. Ability to melt the full range of ferrous and nonferrous alloys under optimum control.

3. Centrifugal casting develops pressures up to 60 lb, thus insuring metal will reach all recesses in the investment. This reduces the number of risers required for many castings.

4. Slag control is excellent, assuring high purity metal in the castings.

5. Casting pressure is closely controlled through rotating speed of the casting machine and can be adjusted to suit the casting or alloy being poured.

The new process is finding an interesting number of uses for small, high strength parts that must be accurately cast to close tolerances. Most castings are made to specifications of 0.006 in. or less. Where closer tolerance is necessary, accurate working of the dies for the injection molding machine that produces the plastic patterns will permit castings to be held to 0.003 in.

TYPE OF SPRUE depends on size, part shape. Casting may be fed from tree or center button.

Broadly speaking, investment cast parts find economical applications in moderately short run parts which require considerable machining or which could not be produced by any other process. According to Anderson Co. engineers, tooling cost for their short cycle investment casting process is roughly half that of die casting.

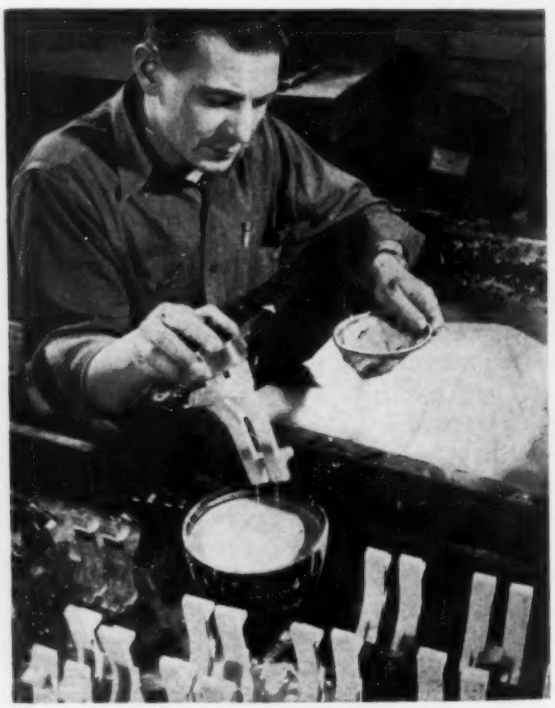
Where quantities are small and the part requires good strength or wear or heat resistance, investment casting may have an advantage over other methods. The process also has the advantage of being able to hold cores accurately and permits undercuts that might be impossible with powdered metal, for example.

While either wax or plastic patterns can be used, W. H. Anderson Co. uses plastics for everything but very short runs—say up to 50 parts. Plastic patterns are easy to handle. They do not damage easily. Using injection molding, production of patterns per man-hr may have an advantage of as much as 10 to 1 compared with wax patterns.

There are two additional advantages to plastic patterns: (1) No heat or special tools are required. (2) Using a solvent, the operator sprues the parts quickly and expertly by simple hand pressure. Air conditioning of the room is unnecessary. The solvent may be applied with a brush or by dipping. The more patterns forming a cluster, the more economical the operation.

The method to be used for sprueing plastic patterns depends on the size and shape of the part, size and number of holes to be cored out

INSPECTION quickly detects variation in finished part. Here, pattern cluster, casting are compared. Tolerances average 0.006 in. or less.



SPECIAL PRECOATING is applied for steel castings by dipping. Part is dusted with dry sand, then allowed to dry for ½ hr.

and other factors. Two basic methods are employed: (1) Feeding from a center button. (2) Feeding from a central stem or tree.

Use a center button gives good metallurgical control. All parts are fed from a single, large riser. This method must be used in some applications having dead end cores. With a center riser many small parts can be made in a single flask.

Speeding up of the investment casting cycle has been made possible largely by the development of a special heat-resistant precoating solution.

The special precoat formula developed by W. H. Anderson Co. chemists and Mr. Leonard Dean of the Dean Co., technical consultants, dries very rapidly. It is applied by dipping. Only a single coating is required. After dipping, the part is dusted in 60 mesh dry sand and permitted to dry for ½ hour. The formula is used for steel parts only.

Principal advantage of the precoating is its ability to withstand heat shock. This makes it possible to bring the drying furnaces up rapidly to casting temperature without causing cracking, rupture or distortion of the cavity.

Dried pattern assemblies are mounted on a steel plate inside a steel flask. Backup material is added in liquid form while the flask is vibrated by a Syntron vibrating machine. Careful, slow pouring plus vibration insures filling around the pattern, including all small holes; it also eliminates the possibility of bubbles in the investment or around the pattern. Flasks are vibrated for 5 minutes. They are then permitted to stand for 1 hour prior to firing.

During drying in an electric furnace, flasks are held at temperatures ranging up to 1800°F for periods varying from 1 to 5 hours. The time-temperature cycle is carefully controlled.

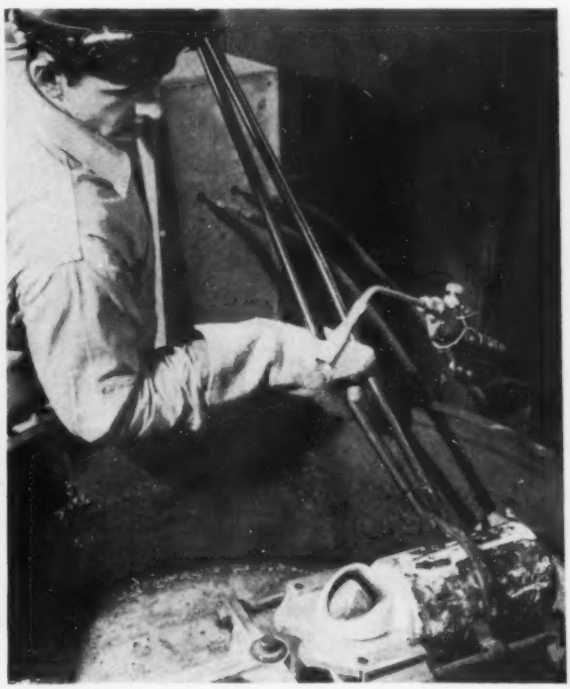
During heating in a Hoskins electric furnace the plastic pattern is completely vaporized. Gas escapes through the opening in the bottom of the flask. No ash remains and the cavity in the investment mold corresponds exactly to the original plastic pattern.

A gas-heated pot type furnace is employed to preheat aluminum and nonferrous alloys. After the metal is transferred to a converted centrifugal casting machine, high-frequency electric power is turned on momentarily to heat the metal to proper pouring temperature. To simplify handling and weighing, both cut wire and pellet materials are used. Up to 50 lb of metal can be melted in the pot-type furnace.

Starting with cold metal, 5 lb of steel can be melted in the spark gap induction-type electric furnace in 5 min. The operator loads or unloads one casting machine while the other machine is operating. Normal rate of rotation of the centrifugal casting machine is 300 rpm but this may be reduced to 150 rpm or speeded up to 500 rpm as required. High speeds are generally used for very small pieces.

Centrifugal casting permits excellent control of the slag which tends to remain in the center of the whirling crucible while the pure metal escapes through an opening in the crucible approximately ¼ in. above the level of the hot metal.

DURING HEATING the plastic pattern is completely vaporized. Temperatures range to 1800° F. Gas escapes through flask opening.



CENTRIFUGAL CASTING machine, equipped with induction heating unit, runs at speeds to 500 rpm. High speeds are for small parts.

Little oxygen helps—

INERT-GAS WELDING Cuts Cost of SAE 1020 Dolly Wheels

◆ New techniques have made inert gas-shielded metal arcwelding competitive with older processes for joining mild steel . . . Two press-formed sections are butt welded to form a trailer dolly wheel.

◆ Parts need no further joint preparation after forming . . . Welds have 100 pct penetration . . . Rod is fed at 244 ipm . . . Elimination of post-weld cleaning and speed of welding overcome competitive disadvantages.

By D. V. Wilcox
Regional Process Representative
Air Reduction Sales Co.
New York

◆ TECHNIQUES have been developed for inert-gas metal arcwelding of mild steel so that it can now be used competitively for an increasing number of applications. Previously, use of the process was confined primarily to the so-called hard-to-weld metals where it proved its superiority, particularly in volume work. Speed of deposition, elimination of slag removal and other advantages have made it possible to reduce welding costs and improve quality.

One such application is that of welding dolly wheels for trailers at Youngstown Steel Car Corp., Niles, Ohio. The wheels are made by press forming two 3/16-in. thick rounds of SAE 1020 steel. The rounds have a 12-in. OD and a 2½-in. diam hub hole which is punched during the press-forming operation. Three welds are required—a butt weld to join the two pressed sections, and two fillet welds which join a sleeve to the wheel.

At the first welding station, the two wheel halves are butted together and placed in a specially-designed fixture which holds and rotates the wheel in a vertical position. Welding is done with an Aircomatic head which feeds 1/16-in. diam A675 mild steel wire at the rate of 244 ipm. The wheel halves are welded as formed without any further edge preparation. Argon, with 2 pct oxygen added, shields the weld puddle and welding wire. The gas flow rate is 50 cu ft per hr.

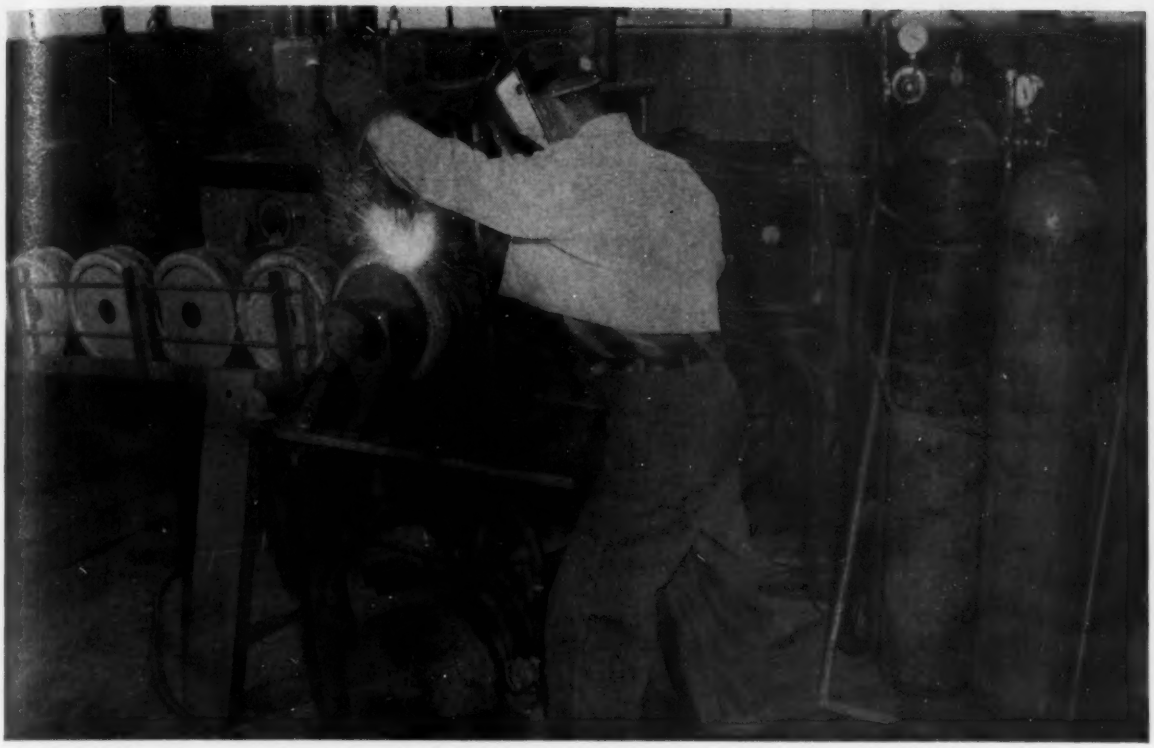
Requirements call for 100 pct penetration in making the butt weld. Also, weld reinforcement must be held to a minimum. Both of these requirements are being fulfilled. Original estimates also called for a very tight time cycle, but once production experience was gained, welding time was cut approximately in half.

When the butt weld is completed, the wheel is removed from the welding fixture and placed on an inclined ramp where it rolls to the hub welding station. A sleeve is then inserted through the hub holes and the wheel positioned at the proper angle on a rotating fixture. A ¼-in. fillet, with space allowed for an Alemite fitting, joins each side of the wheel to the sleeve.

In designing the hub welding station, the mounting for the welding head was arranged so that the welding head could be positioned to any desired angle. Also, by counterbalancing the head, it can be lifted out of the way easily when the fixture is loaded and unloaded.

Welds are consistently good, meeting all requirements for both quality and strength. Butt welds are practically flat, having only a 1/32-in. reinforcement and free of any under-cutting. The welds are uniform, smooth and sound.

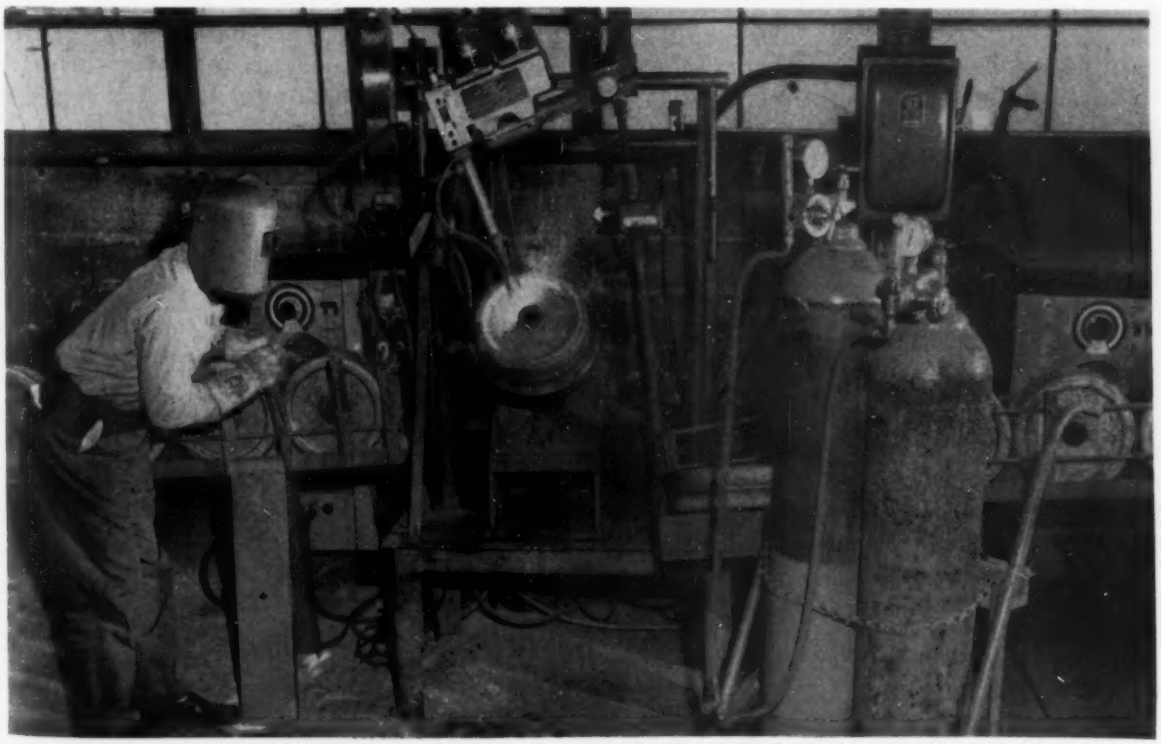
A big factor in reducing welding costs is that no post-welding cleaning of any kind is neces-



BUTT WELD forms trailer dolly wheel from two pressed sections of SAE 1020 steel. Argon with 2 pct oxygen added shields the weld zone as welding rod is fed at the rate of 244 ipm.

sary. Since no flux is used, welds are clean and the possibility of flux entrapment is completely eliminated. Another cost factor which favors the use of inert-gas metal arcwelding is the elimination of electrode stub losses. With the Aircomatic head, continuous coils of welding wire are used so that nonproductive time is held to a minimum.

In using the A675 mild steel rod for both the butt and fillet welds, good physical characteristics are obtained. Average yield strength is 60,000 psi and tensile strength is about 73,600 psi. In root and face bend tests, the welds were bent 180° without cracking. Weld metal specimens showed 26 pct elongation in 2 in. and a 37 pct reduction in area.



HUB WELDING MACHINE joins sleeve to wheel with two 1/4-in. fillet welds. Loading and unloading of wheels from the fixtures have been simplified by counterbalancing the welding head.

Turning, shaping, broaching—

◆ Here's basic information on the machining of titanium . . . Much of this data, culled from some 28 reports prepared by engineers of the University of Michigan, throws new light on cutting tool design and factors affecting tool life.

◆ Avoid small nose radii in tools used for shaping titanium . . . Rake angles for shaping cannot be as large as for continuous cuts like turning . . . In turning, side rake values of 24° to 32° give best tool life . . . A solution of 5 pct $NaNO_2$ in 95 pct water gave highest cutting speed-tool life values in turning Ti 75A.

◆ In broaching, greater relief angles and smaller rake angles than those normally used in broaching ductile materials are suggested.

How Does Titanium Machine?

Part II

By O. W. Boston
Chairman
Dept. of Production Engineering
University of Michigan
Ann Arbor, Mich.

◆ TEMPERATURES at the tool point are appreciably higher in turning titanium alloys than for commercially pure titanium, stainless steel or medium carbon steel, recent machinability studies by the University of Michigan Engineering Research Institute have determined. Principal metal cutting methods and basic factors involved in machining of titanium were investigated in the project planned by Watertown Arsenal and the Detroit Ordnance District of the Armed Services.

In the turning-cutting temperature studies, a tool-work thermocouple and molybdenum high speed steel tools were used. These tools, of the shape 0, 32, 6, 6, 6, 15, 0.010 in radius, operated at a constant cutting speed of 25 fpm. The temperatures developed at a constant depth of 0.050 in. for various feeds and metals were recorded. For a feed of 0.010 in., cutting dry, temperatures were: 380°F for SAE 1045 steel, 390°F for Ti-75A, 510°F for 304 stainless steel, 565°F for Rc-130B, 615°F for the Rc-130A and 680°F for Ti-150B. Note that pure titanium gives about the same temperatures as the annealed steel. As the depth of cut varied, temperatures for the various metals, for a feed of 0.006 ipr and 25 fpm, remained practically constant.

Part I in the series "How Does Titanium Machine?" was published Jan. 21. Part III will appear in next week's issue of The Iron Age.

Next the influence of cutting fluids on the cutting-speed tool-life line of Ti-75A was studied. The metal was machined at a feed of 0.006 ipr and a depth of cut of 0.050 in. Speed for dry cutting was established as 100 pct. A sulfurized chlorinated mineral oil gave a slightly higher cutting speed for a given tool life of 107 pct. The emulsion gave still higher speeds of 123 pct. The 5 pct solution of $NaNO_2$ in water gave highest values and best performance at 133 pct.

Side rake angle values of 24° to 32° were found to give best tool life results for the various metals. This conclusion was based on studies of the influence of side-rake angle on tool life when machining the several metals with the same high speed steel tool. The tool was ground to various values of side-rake angle. Cutting speed was recorded for each metal to give maximum tool life of 60 minutes for all metals.

Tool shape important

Roughness increased from an average of 45 to an average of 330 microinches, rms, as the feed was increased from 0.005 to 0.020 ipr in comparative studies of surface finish in turning. The study of surface finish as a result of turning compared four grades of titanium with two standard steel grades. The metal bars were turned with a tool of a shape of 15, 15, 6, 6, 6, 15, 1/32 in. rad.

Surface finishes at 0.010-in. feed were 95 microinches, rms, for Ti-150A, 100 for Rc-130B, 110 for 304 stainless steel, 120 for Rc-130A and 135 for Ti-75A. Surface finish for SAE 1045 annealed steel was 290 microinches, rms.

Small nose radii cannot be tolerated in shaping titanium although shaping performance of titanium generally is predictable and similar

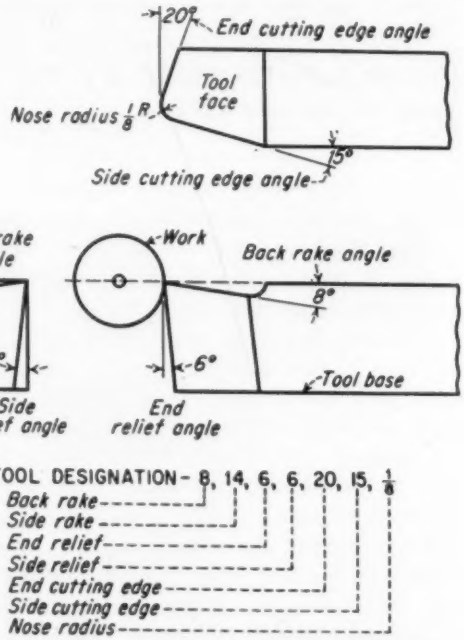
to that of steel. Rake angles for shaping cannot be as large as for continuous cuts like turning. Smaller rake angles are needed to withstand the impact peculiar to shaping. This condition is aggravated by heavier feed rates. Rigidity is of paramount importance.

In machining studies of titanium and its alloys by shaping, factors such as tool shape, cutting speed, feed and depth of cut were evaluated. High speed steel tools of the 18-4-1 type were used in the shape of 0, 28, 6, 6, 6, 15, 0.030-in. rad. A heavyduty 32-in. stroke Gould and Eberhardt shaper was used. Cutting speeds for 60-minute tool life were found to be: 132 fpm for SAE 1045 steel, 106 fpm for Ti-75A, 67 fpm for Ti-150A and 36 fpm for Rc 130B. Depth of cut was 0.050 in. and the feed 0.010 in. per stroke.

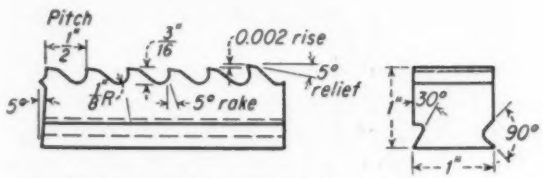
Titanium demonstrated the same sensitivity to both depth of cut and feed rate as hot-rolled SAE 1045 steel. Principal difference is the speed level. The cutting speed V_{10} for a 10-minute tool life as a function of feed and depth of cut may be expressed by the equation and its constants, Table I.

Greater relief angles and smaller rake angles than those normally used in broaching ductile materials are suggested for titanium and its alloys. Surface broaching of commercially pure titanium, Ti 75A, and alloys Ti 150A, Rc 150B and Rc 130B was compared to that of SAE 1045 steel. Results of tests in surface and hole broaching, using cutting forces, surface finish and tool wear as criteria, show orderly and predictable results. Test cuts were run dry at 20 fpm on a vertical hydraulic broaching machine. Specimens were in the form of 2-in. cubes.

For broaching titanium a relief angle of 5° as compared to more generally used values of ½° to 3° proved satisfactory. On Ti-150A, at



TYPICAL high speed steel tool, ground for turning steel of 250 to 300 Bhn, similar to those used in turning and shaping studies.



IN BROACHING TITANIUM, relief angles should be increased, rake angles reduced.

TABLE I

CUTTING SPEED

For a 10-Minute Tool Life*

Material	x	y	K_1	V_{10}
SAE 1045	0.075	0.125	4.15	155
Ti 75A	0.500	0.31	4.46	130-110
Ti 150A	0.745	0.132	1.59	75
RC 130B	0.55	0.149	2.28	43

* Vs. feed rate and depth of cut. Expressed by the equation $V_{10}f^x d^y = K_1$ with values of 0.010 in., f; 0.050 in., d.

TABLE II

SURFACE BROACHING VALUES

Material	Tool Rise Per Tooth in inches	Unit Hp	Cutting Force Ave. for 150 Cuts	Surface Finish Range for 150 Cuts, microinches, rms
SAE 1045	.002	1.291	4,090	115-135
	.005	1.305	10,360	100-150
Ti-75A	.002	1.205	3,820	13-23
	.005	1,144	9,080	10.5-14
Ti-150A	.002	1.814	5,750	19-28
	.005	1.298	10,300	32.5-50
Ti-150B	.002	1.825	5,780	11.5-13.5
	.005	1.868	14,820*	37**
RC-130B	.002	1.64	5,190	8-11
	.005	1.023	8,120	7.5-14.5
RC-130A	.002	1.60	5,059	12.5-15.5
	.005	1.535	12,139	29-35

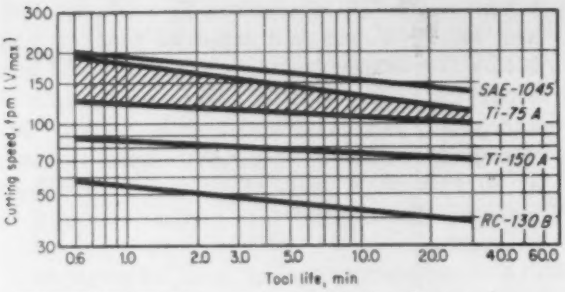
* 3 cuts only. ** First cut.

TABLE III

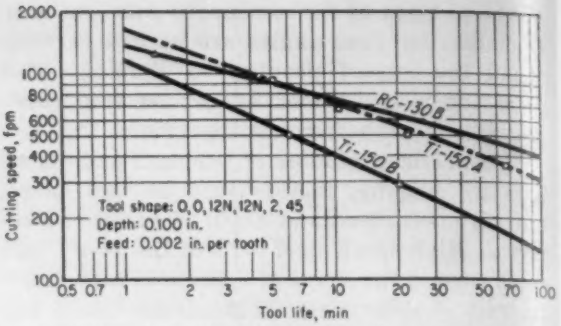
INTERNAL BROACHING VALUES*

	Cutting Force, Average		Unit Horsepower		Surface Finish Microinches, rms	
Material	1705	1706	1705	1706	1705	1706
Ti-75A 5 Cuts	4700	6343	1.54	1.04	21-27	15-20
Ti-150A 5 Cuts	3890	5200	1.28	0.854	12-16	12-16
RC-130A 5 Cuts	5850	4500	1.92	0.74	16-21	14-19
RC-130B 5 Cuts	7000	4230	2.30	0.70	11-22	7-10

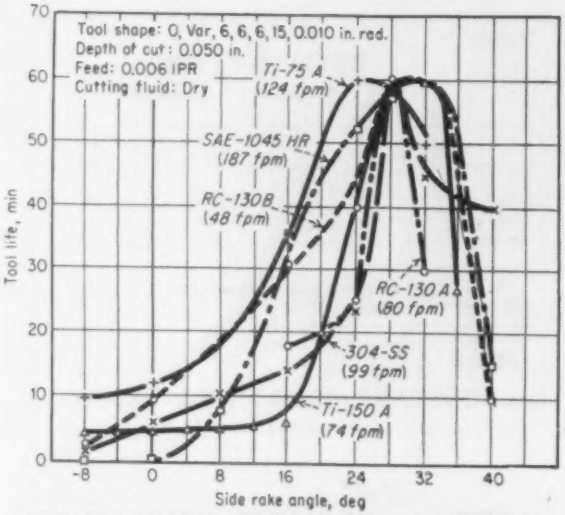
* 0.824 in. diam hole. Tool 1705 is a standard pull breach. Tool 1706 is of special design.



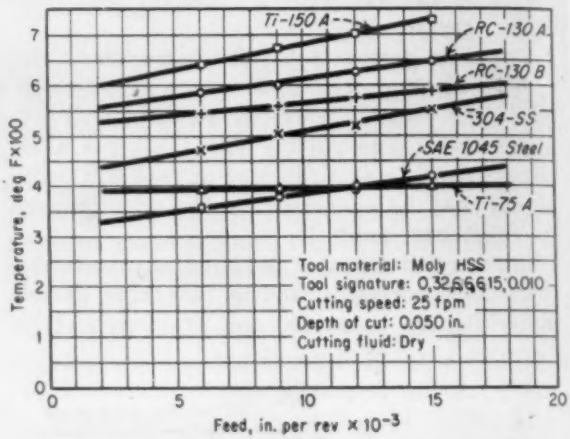
CUTTING SPEED—tool life relationship in shaping titanium metals and 1045 are compared.



SINTERED CARBIDE tipped tools were used in these cutting speed-tool life tests, cut dry.



EFFECTS OF SIDE RAKE angles on tool life in dry turning. An 18-4-1 tool steel was used.



TO FIND TEMPERATURES in turning, a tool-work thermocouple was used.

0.002-in. rise per tooth, the ½° relief gave 50 cuts producing 55 microinches, rms. The 2° relief gave 50 cuts at 35 and the 5° relief gave 150 cuts at 20. Cutting forces were about the same for all.

Rake angles should be below those normally recommended for broaching ductile materials because of the tendency of the tool to dig in. A 5° rake angle proved better than the 20° angle. A rise per tooth of 0.002 or 0.005 in. (step) gave acceptable performance in all cases except when broaching Ti-150B at 0.005-in. rise per tooth. Chip thickness measurements indicated that 0.002-in. rise per tooth produced better pressure distribution on the face of the tooth.

Superior surface finishes were obtained for Rc-130B at both the 0.002 and 0.005-in. rise per tooth. Values of 6 to 11 microinches, rms, were obtained for the former condition and 7.5 to 14.5 for the latter. All the titanium materials gave a surface finish under 25 microinches, rms, as compared to 130 for SAE 1045 steel cut dry.

Cutting forces and unit horsepower values required for broaching titanium materials are comparable to those normally obtained in the machining of steel, Table II. Chip formation presented no problem in the packing of the chip space when the recommended practice on pitch and tooth depth was used.

The same machine was used in hole broaching, but tooled to broach an 0.812-in. reamed hole to 0.824-in. diam and 23/32-in. long, in several metals. Two broaches were used. One, a standard pull broach (No. 1705), had 15° rake, 1° relief and a rise per tooth of 0.001-in. on the 6 roughing teeth. A second broach (No. 1706), designed on data obtained in surface broaching, had 5° rake, 5° relief and 0.002-in. rise per tooth on the 3 roughing teeth, to rough the same amount.

Roughing teeth were followed by finishing teeth having 0.0005 in. rise per tooth. Unit horsepower values were lower in internal broaching than for surface broaching due probably to less frictional loss in the machine ways.

Results of these tests are summarized in Table III to show cutting forces, unit horsepower and surface finish, for all tests made. Tool 1706 gave better results in all respects than the standard tool, confirming conclusions arrived at in work on surface broaching.

Automatic Gage Checks Strip Thickness

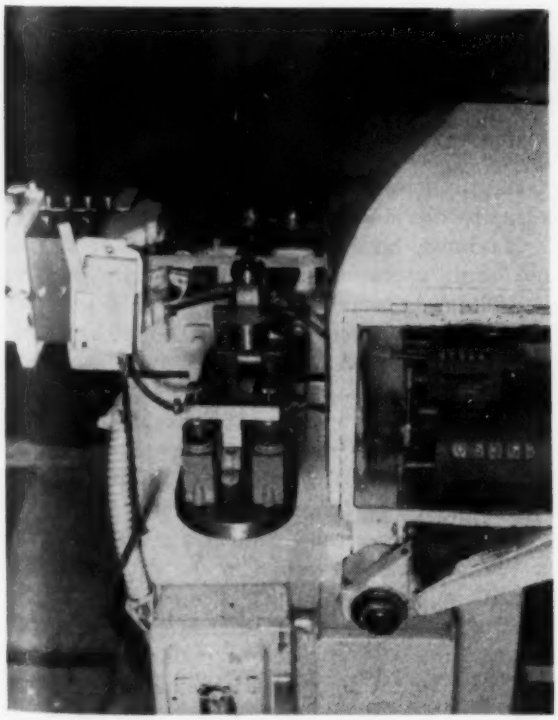
♦ TO PRODUCE small stampings on an automatic basis at high rates of speed many U. S. Multi-Slide machines are employed at the Endicott, N. Y., plant of International Business Machines Corp. Since certain critical dimensions of these stampings must be held to close tolerances, it is essential that the thickness of the thin brass and beryllium copper coiled strip stock employed be held within close thickness limits. If thickness is outside the limits, the machines, which operate automatically, may run large quantities of scrap parts before off limits are detected.

To prevent this, company engineers have designed and applied to several of the machines a gaging device that checks strip thickness continuously as the coil feeds into each machine and stops the machine automatically if thickness proves to be outside limits over lengths of 6 in. Included in the setup is a time delay relay whose purpose is to avoid shutdowns for variations that are of minor importance. If thickness continues outside limits over lengths exceeding 6 in., the device stops the machine until the offsize stock can be cut out and the machine is restarted on stock within thickness limits.

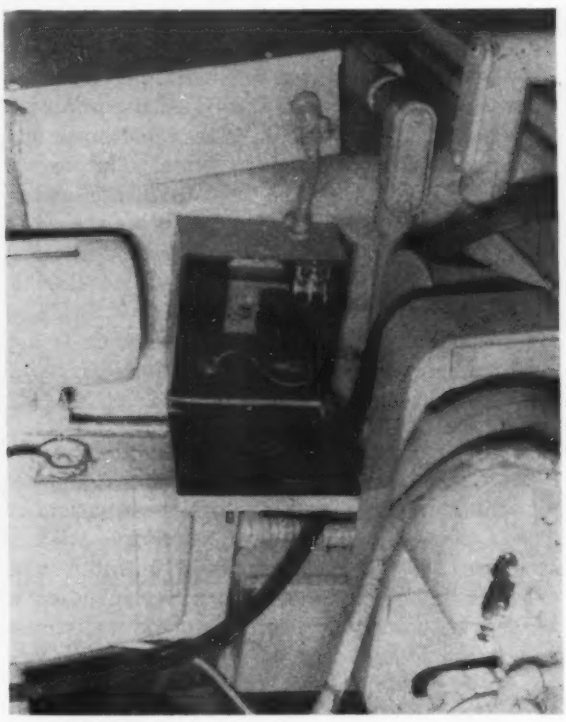
Coils fed to each machine are placed on uncoilers in the usual way. On the way to the automatic feeding device the coil stock passes through the gaging device which includes a pair of rolls the upper one of which is held down by an adjustable spring that applies pressure to the strip fed between the rolls. As the lower roll is supported in bearings having no play, its axis remains fixed, but the upper roll moves up and down small distances as stock thickness varies. A lever is arranged so as to multiply the roll motion by two.

At the outer end of the long lever arm are adjustable microswitches set to open and close for predetermined thickness variations. These switches open and close the circuit through pilot lights. One light goes on for thickness too great and one for thickness below the minimum limit. The switches operate through the time delay that breaks the motor circuit of the machine and stops the machine if the stock is outside thickness limits over lengths exceeding 6 in.

With this device, thickness can be held within limits separated by only 0.00025 in. Besides saving scrap, the device tends to reduce die damage which may result from off size stock. Used with the device is a safety microswitch which stops the machine in case stock buckles through some die fault such as the breaking of a punch.



AUTOMATIC GAGE checks strip thickness as it feeds automatically into multi-slide machine.



TIME DELAY relay used with thickness gage to prevent shutdowns for local thickness variations.

NITRIDING Improves Titanium Properties

Part II

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◆ Nitrided titanium can be used on applications such as bearings and where low friction requirements are necessary . . . Hardness is increased and resistance to galling and seizing is boosted to that of hardened steel.

◆ Creep-rupture properties of titanium and its alloys are improved in the 1000 to 1200°F range . . . Low temperature brittleness not evident at these temperatures . . . Oxidation resistance at 1200°F is improved . . . Corrosion resistance to boiling H_2SO_4 and HCl is improved.

◆ IN THE DEVELOPMENT of surface hardening methods for improving the wear properties of titanium it has been found that not only have these properties been improved but others have been improved as well. Ammonia nitriding, developed at Massachusetts Institute of Technology has improved many properties of titanium and some of its alloys.

It has been shown that ammonia nitriding is a practical method of eliminating seizing and galling.* A wear resistant case is readily formed and should find extensive application. The creep-rupture properties in the 1000 to 1200°F range are improved as well as oxidization resistance at 1200°F. Low temperature brittleness of nitrided titanium is not evident in the 1000 to 1200°F range. Corrosion resistance to boiling H_2SO_4 and HCL is greatly improved where titanium is not subjected to spalling or pitting action.

* THE IRON AGE, Jan. 14, p. 112.

More than 3000 hardness determinations were made during the course of this investigation. A Tukon microhardness tester, equipped with a standard 136° diamond pyramid indenter, was used exclusively. For comparative purposes a Vickers indenter was also used on several series, and it was found that the Knoop and Vickers hardness values were substantially identical throughout the range from 150 to 700 Khn. At higher hardness levels the two curves diverged; unfortunately materials of sufficient case thickness which were harder than 700 were not available for the use of Vickers determinations to allow an extension of the comparison.

Hardness values taken perpendicular to the nitrided surface gave Knoop hardness numbers ranging from 1200 to 1700, comparing quite favorably with observed values on nitrided steels. These values are due to the very thin layer of the titanium nitride (TiN) found on the surface. Cross-sections hardness values are shown in Fig. 1. Data for both titanium and zirconium are shown, indicating major differences between the susceptibilities of the two metals to surface hardening by nitriding with ammonia.

Maximum hardness of nitrided titanium does not occur at the surface, but at a depth some 0.0006 in. below the surface. At this level the hardness in the cross-section is about 1000 Knoop. X-ray data showed that the maximum expansion of the alpha titanium phase due to dissolved nitrogen in the case occurs at the same depth, and confirms hardness data. Fig. 2 shows a plot of the lattice parameters of a nitrided 75 A titanium specimen as a function of depth below the nitrided surface, the shape generally conforms to the hardness curve in Fig. 1.

In forming a case about 0.004 in. thick, a titanium specimen grows approximately 0.001 in. per surface, due to outward migration of titanium ions and to the alpha lattice expansion accompanying the solution of nitrogen. Since the maximum hardness occurs at a depth some 0.0006 in. below the surface of the specimen, it is possible to

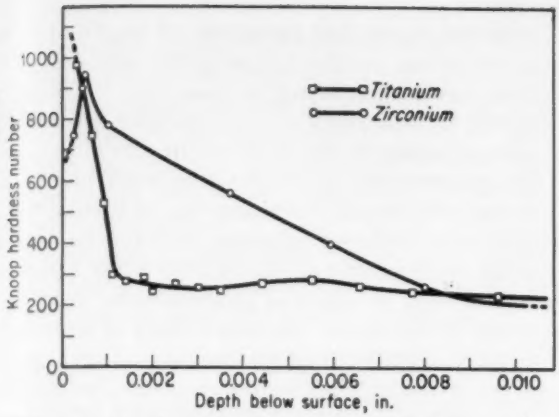


FIG. 1—Hardness gradients for titanium and zirconium ammonia nitrided, at 1595°F, 48 hr.

grind off approximately one-half of the expanded dimension, without sacrificing any of the valuable hard case. Tolerances may thus be held within 0.001 in. overall without allowances for growth in the hardening process. (See Table I.)

One of the major aims of this program was to improve the resistance to galling and to evaluate the properties relating to bearing applications, primarily sliding friction. Tests regarding galling and seizing were run. The equipment consisted of a horizontal mounting plate to which a flat specimen was mounted, and an eccentric torsional ring to which a pointer was attached. A number of strain gages were mounted on the ring, and calibrated to show the coefficient of sliding friction between the flat specimen and the pointer. Application of loads on the pointer were such that an average coefficient at several loads, and endurance tests at constant loads, were determined.

Numerous metal combinations were run, some

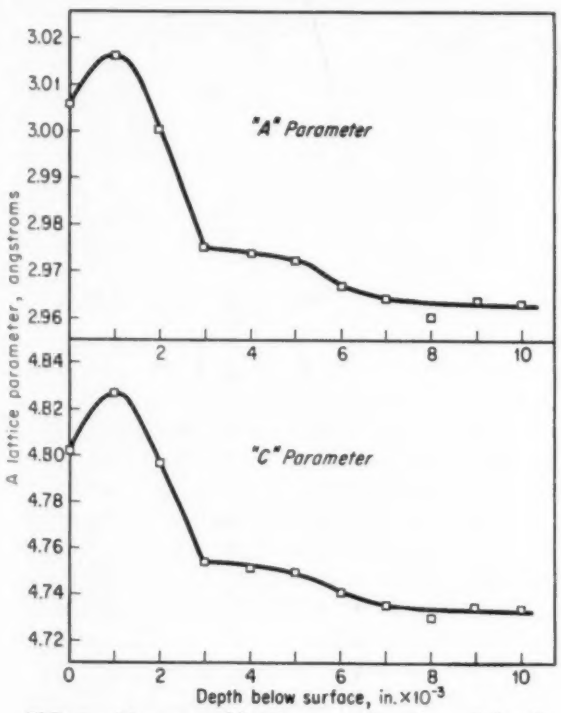


FIG. 2—Hexagonal lattice as a function of depth for nitrided titanium 24 hrs, 1545°F.

TABLE I

RATE OF SPECIMEN GROWTH

Nitriding Time, hrs	Thickness Increase at 1600 F	Thickness Increase at 1650 F
4	0.00004 in.	0.00046 in.
9	0.00011	0.00081
16	0.00040	0.00125
24	0.00057	0.00139
36	0.00090	0.00152
48	0.00117	0.00162
72	0.00142	0.00170
96	0.00161	0.00179

TABLE II

SLIDING FRICTION COEFFICIENTS

Test Conditions and Materials	Friction Coefficient at Load 100 gm.	500 gm.	1000 gm.	Average
Mild steel pointer sliding on mild steel; no lubrication	0.31	0.29	0.30	0.30
Hard steel pointer sliding on mild steel; no lubrication	0.28	0.30	0.31	0.29
Commercial titanium pointer sliding on titanium sheet; no lubrication	0.45	0.61	0.80	0.62
Mild steel pointer sliding on commercial titanium; no lubrication	0.51	0.49	0.49	0.49
Hard steel pointer sliding on commercial titanium; no lubrication	0.46	0.45	0.48	0.47
Mild steel pointer sliding on nitrided titanium; no lubrication	0.36	0.37	0.32	0.36
Hard steel pointer sliding on nitrided titanium; no lubrication	0.31	0.26	0.26	0.28
Nitrided titanium pointer sliding on nitrided titanium; no lubrication	0.10	0.13	0.14	0.13
Nitrided titanium pointer sliding on nitrided titanium; lubricated with palmitic acid	0.08	0.08	0.08	0.08

TABLE III

DRY FRICTION ENDURANCE TEST

Load, gm.	No. of Revs.	Friction Coef.
500	1	0.089
500	10	0.097
500	20	0.106
500	30	0.110
500	40	0.116
500	50	0.128
500	60	0.130
500	100	0.128
500	200	0.135
500	300	0.137
500	400	0.135
500	500	0.136
500	600	0.138
500	700	0.137
1000	800	0.137

TABLE IV

ALLOYS IN CREEP RUPTURE TESTS

Type	Composition
Ti-75A	Commercial Purity Titanium
Ti-140A	3% FeCr, 3% FeMo
Ti-155 AX_1	2% FeCr, 2% FeMo, 4% Al
Ti-155 AX_2	2% FeCr, 2% FeMo, 5% Al
Ti-Al Alloy	8% Al

TABLE VI

SIZE EFFECT, 75A CREEP-RUPTURE

Nitriding Time, hrs*	Stress, psi	Temp., Deg. F	Rupture Life, hrs	Elongation, Pct	Reduced Area, Pct	Specimen Diam, in.
0	5,000	1200	2.8	104	98	0.160
0	5,000	1200	3.0	115	98	0.250
72.0	5,000	1200	5.2	41	78	0.160
72.0	5,000	1200	6.2	48	62	0.250
72.0	5,000	1200	7.2	36	59	0.250

*At 1595° F.

between nitrided titanium sheet and steel pointers, and others with nitrided titanium pointers. Table II summarizes the results of these tests.

The indicated loads of 100 to 1000 grams are not directly significant since the exact stress on the pointer tip as a result of the applied weights can only be estimated. Stress in the range from 10,000 to 20,000 psi is thought to have been applied during the tests.

Previous experience with the above test equipment had shown that an endurance test of 500 revolutions under a 500 gm load was roughly equivalent to the normal life of a steel bearing. For additional comparative data, a run of this type was made, using a nitrided titanium tip and a flat plate of nitrided titanium. Table III summarizes the results of the run.

Following the endurance test of 800 revolutions, a small quantity of palmitic acid was placed on the surface of the nitrided plate as a lubricant, and 50 additional revolutions were run. The average friction coefficient for this series was 0.080. Examination of both pointer and plate following the run showed no failure in the nitrided case and no evidence of seizing or galling. These tests indicate that nitrided titanium is a suitable material for bearing applications where low friction characteristics are desired.

Nitrogen in titanium has been shown to cause brittleness. For this reason the room temperature ductility properties of nitrided titanium were determined. This was done by means of a simple bend test, using flat specimens 0.20 in. thick by 1.5 in. long and 0.5 in. wide, over a 0.25 in. diam bending mandrel.

It was found that regardless of length of time of nitriding, or the temperature, nitrided titanium specimens having a case were universally brittle. Substantially no bend ductility was found.

Since ammonia was used for the nitriding, similar tests were run in which nitrogen nitrided specimens were tested. Following this additional bend tests were made on ammonia nitrided specimens which were vacuum annealed from a few hours to several days at elevated temperatures. By these means it was hoped that any effects of hydrogen would be eliminated. It was found that regardless of the treatment, brittleness remained, indicating that hydrogen was not associated with this undesirable trait.

The high hardness case, was removed from a specimen by grinding and etching. The remaining core was then subjected to the bend test and it was found that a 90° bend could be accomplished without fracture. Bending beyond 90° resulted in ductile tearing. It seems evident therefore, that surface hardened titanium derives its extreme brittleness from a notch-sensitive condition inherent in the highly stressed expanded nitrogen-rich case, and no treatment short of removing the hard layer will avoid the brittleness. This probably will prove a serious problem in applications involving bending moments, and will limit the utility of nitrided titanium as a potentially good bearing material for certain applications.

One of the most interesting and important properties of nitrided titanium is associated with the improvement in elevated temperature properties. To evaluate the relative merits of the nitrid-

TABLE V

CREEP-RUPTURE TEST DATA

Specimen	Alloy	Nitriding Time, hr.*	Stress, psi	Temp. °F	Rupture Life, hr.	Elongation, Pct	Reduction in Area, Pct	MM Creep Rate Pct per hr.
1		4.5	6,000	1000	66.0	44	80	0.08
2		17.0	6,000	1000	178.0	29	71	0.015
3		17.0	6,000	1100	12.1	38	67	.....
4		56.5	6,000	1100	17.5	28	....	.....
5	Ti 75 A	72.5	6,000	1100	24.5	.....	....	.....
6		43.0	6,000	1200	3.2	41	....	.....
7		118.0	6,000	1200	4.5	27	....	.....
8		72.0	8,000	1200	0.51	47	69	.....
9		72.0	5,000	1200	4.7	25	64	.....
10		72.0	3,000	1200	17.8	56	83	0.14
11		....	10,000	1200	0.50	68	90	21.0
12		....	6,500	1200	2.7	68	89	8.0
13	Ti 140 A	....	4,000	1200	16.0	72	80	.....
14		72.0	10,000	1200	1.8	79	85	.....
15		72.0	7,000	1200	6.0	120	83	4.1
16		72.0	5,000	1200	15.8	67	86	.....
17		.....	15,000	1200	0.67	90	....	.....
18		.....	10,000	1200	3.0	85	95	12.0
19	Ti 155 AX	.....	5,000	1200	27.1	46	78	1.15
20		72.0	10,000	1200	7.3	33	75	1.8
21		72.0	7,500	1200	32.0	24	....	.....
22		72.0	5,000	1200	198.8	12	45	0.0096
23		....	15,000	1200	0.8	91	96	50.0
24		....	15,000	1200	0.73	110	....	.....
25		....	10,000	1200	2.9	157	80	.....
26	Ti 155 AX	....	4,500	1200	45.0	127	65	5.3
27		72.0	16,600	1200	2.8	18	75	0.78
28		72.0	10,000	1200	72.7	13	30	0.035
29		72.0	7,000	1200	446.7	11	15	0.006
30		....	22,000	1200	50.0	24	39	0.18
31		.....	20,100	1200	115.5	16	31	0.10
32	Ti 8% Al	.....	15,000	1200	120.2	24	20	0.12
33		72.0	25,500	1200	10.0	11	31	0.22
34		72.0	22,000	1200	36.4	21	22	0.10
35		72.0	19,000	1200	88.2	12	12	0.05

* At 1595 °F.

ing treatment, standard creep specimens of 0.160 in. diam, with a 1 in. gage length were machined from bar stock of commercial titanium and four alloys. Alternate specimens were nitrided, so that a minimum variation in composition would be reflected in the test results. The alloys tested are shown in Table IV.

Creep-rupture tests were run at 1000, 1100, and 1200°F, on commercial titanium and at 1200°F on the titanium alloys.

Nitriding lowers ductility

Table V lists the results of all the creep rupture tests and Fig. 3 is a log stress, log rupture time plot of the 1200°F creep rupture results. It is evident that ammonia nitriding significantly improves the creep rupture performance in all instances. It is to be noted that in the as-received condition Ti-155 AX_1 and Ti-155 AX_2 points fall on the same curve, yet after nitriding the improvement is markedly greater in Ti-155 AX_2. This is unexplainable at the present time. Only in the case of the 8 pct aluminum alloy was the improvement of some doubt after nitriding. The three nitrided specimens fit one straight line whereas the as-received values fall about the curve. Since this alloy was a small experimental heat, it may have been subject to greater than normal variation. In any event, the nitrided Ti-8 pct Al curve shows useful high strength properties at 1200°F.

In the un-nitrided condition all the alloys except Ti-8 Al have equal or higher total elongation and reduction of area values than the pure titanium at 1200°F. In these instances the ductility is much too large. Nitriding, in increasing the strength and creep resistance, decreases the ductility. In the case of Ti-140 A the ductility remains high and is higher than for commercial titanium. In the case of Ti-155 AX_1 and Ti-155 AX_2 the ductility is lowered considerably but remains adequate. It will be noted that the elongation decreases with increasing rupture life (decreasing stress) for these two alloys in the nitrided condition.

Oxidation resistance improved

From Table V it is evident that even short periods of nitriding time improve the rupture life markedly at 1000°F. The effect is less at 1100° and not large at all at 1200°F. This is not a complete test in that the stress was quite high for the 1200°F tests and the relatively short rupture life values may not have permitted a full evaluation of the effects. It would appear that a full nitriding treatment is required for maximum benefits at 1100 and 1200°F on improvements in rupture life.

To determine the role of specimen diameter on the improvements in creep-rupture properties, two sizes (0.160 in. and 0.250 in. diam) were machined and nitrided. Table VI lists the creep-rupture tests results all taken at 1200°F at 5000 psi on commercial titanium. There is no difference between the two sizes of un-nitrided bars, as was expected. In the nitrided condition the two larger bars were only slightly stronger than the smaller diam bar. Unfortunately the capacity of the nitriding furnace did not permit the preparation of still larger diameter creep-rupture bars to continue the program.

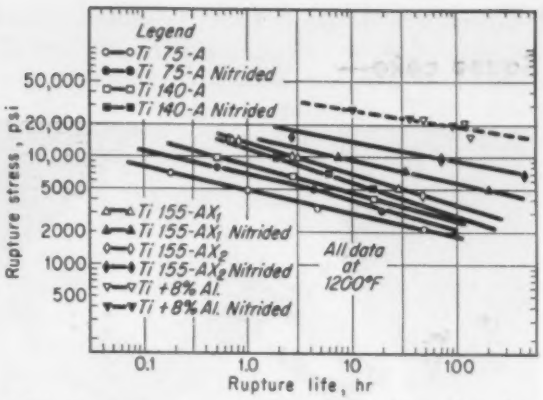


FIG. 3—Log stress-Log rupture life plot for titanium and four alloys at 1200°F.

One very important feature observed during the course of the 1200°F testing was a very considerable improvement in the oxidation resistance of the nitrided titanium bars. This factor should enhance the longer times application of nitrided parts at high temperatures.

Pits increase corrosion rate

Corrosion tests on titanium specimens after nitriding 24 hr at 1545°F were made in boiling 10 pct solutions of hydrochloric and sulfuric acid in respective runs. Standards in the form of un-nitrided specimens were run simultaneously under identical conditions.

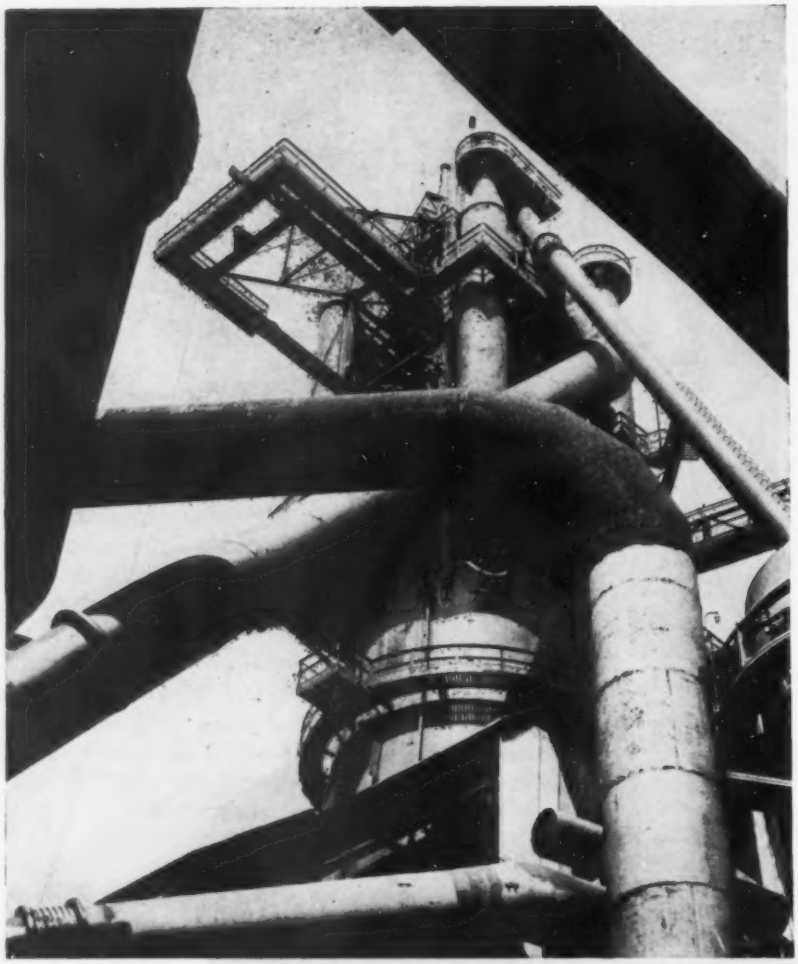
In general, the results indicated that as long as the case was intact, nitrided titanium corroded approximately one-sixth as fast as untreated titanium. Once pitting occurred, the corrosion rate was higher for the nitrided specimens, indicating a chemical potential between the highly stressed case and the core.

Passivation causes weight gain

Additions of 0.2 grams per liter of ferrous iron in the sulfuric acid solution acted as a passivating agent to the extent of reducing the corrosion rate of nitrided titanium to less than 0.001 in. per year. An equivalent addition of titanium ion to the boiling hydrochloric acid solution resulted not only in the passivation of the nitrided titanium, but brought about a gain in weight. X-ray studies of the surface after testing indicated that titanium hydride had formed on the surface.

Applications of nitrided titanium in corrosive media should be limited to environments where the expected life of the metal does not exceed the time required for pitting to occur, or where the danger of spalling or cracking is not great.

Saves coke—



BLAST FURNACE of Republic Steel Corp. at Cleveland is one of seven operated at top pressure.

PRESSURE OPERATION Grows In European Blast Furnace Practice

By E. L. Pepper
Metallurgist
Arthur D. Little, Inc.
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◆ EXPERIENCE in pressure operation of blast furnaces by Republic Steel Corp. shows that pig iron production can be increased by 10 to 15 pct over that of furnaces in normal operation. By reducing gas velocity through the furnace with a throttling valve, and thus increasing the pressure of the gases, gas-solid contact is improved and flue-dust losses are held to a reasonable level. Two furnaces altered by Republic and put into pressure operation in 1946 are still working satisfactorily. Others have since been equipped for pressure operation.

Interest in the pressure blast furnace outside the United States has resulted largely from the

efforts of Union Carbide and Carbon Corp., connected with this development since its beginning. It has been assisted in this work by the industrial consulting and research firm of Arthur D. Little, Inc., and by Republic Steel, which has shown its pressure blast furnaces to visitors from all parts of the Free World.

Steelmen have been kept informed of operating results, new developments, and engineering details of alterations for converting or constructing high top-pressure blast furnaces. Operational experience abroad was pioneered by Colvilles, Ltd., whose No. 2 blast furnace at Tollcross, Scotland, has been operating at elevated top pressures since January 1951.

Although Colvilles still has the only pressure furnace operating in Western Europe, at least six others are being built or converted for pressure operation. Four of these are in the British Isles and two in West Germany. One furnace under construction in England will be able to operate at a top pressure of 20 psi.

As early as January 1951, the Russians announced the conversion of six blast furnaces at Magnitogorsk. At that time, they reported that under pressure operation average output had increased by 20 pct, coke consumption had decreased 11 pct, and flue-dust losses had decreased 22 pct. It is not known how many more furnaces behind the Iron Curtain have been converted since 1951, but furnaces in Czechoslovakia are being operated on high top pressure.

Because of the interest developed in Western Europe and the British Isles in pressure blast furnaces, engineers from both UCC and Arthur D. Little, Inc., visited a number of blast-furnace plants abroad to acquaint steelmen with the advantages of pressure operation. They also assisted in planning for construction or conversion of pressure furnaces.

Depending on the steelmaking process used, the effect of increased pig-iron output on the overall economics of steel plants can vary widely. In plants producing openhearth steel from a mixture of blast-furnace hot metal and scrap, an increase of 100 tons per day of hot metal means an increase of about 200 tons per day of steel ingots. On the other hand, in the production of Bessemer steel in many European plants, because of the types of iron ore smelted, an increase of 100 tons per day of hot metal means only an increase of about 100 tons of steel ingots per day.

Wind volume up 10 to 15 pct

Any saving in coke consumption is of prime importance to steel plants abroad since coke is more expensive than in this country. Also, the much lower grade ores commonly used require more coke per ton of iron than the ores used in the United States. Many foreign steel mills must use ores of smaller particle size. Therefore, methods of decreasing flue dust are of major importance.

Until now, pressure blast furnaces in this country have been operated to maximize iron production rather than to minimize coke consumption and flue-dust production. Similarly, the No. 2 furnace of Colvilles, Ltd., has been

♦ Pressure operation of blast furnaces, a practice pioneered by U. S. firms, is being well received by European steel plant operators . . . One furnace in Scotland has been operating at high top pressures since January 1951 . . . At least six others, four in Britain and two in West Germany, are being built or converted for pressure operation.

♦ In this method, gas velocity through the furnace is reduced with a throttling valve, increasing the pressure of gases and improving gas-solid contact . . . Output of pig iron is increased by at least 12½ pct . . . Wind volume can be boosted 10 to 15 pct over the normal level without increasing coke rate . . . Helps to produce iron from leaner ores.

Republic's Experience—

These figures show benefits from Republic Steel's seven furnaces converted or built for pressure operation. They represent 36 furnace-years of operation at elevated top pressures and 23-furnace-years under normal operation. Pig iron production during this time was more than 21 million tons.

		NORMAL PRESSURE OPERATION				HIGH TOP PRESSURE OPERATION			
Furnace No.	Hearth Diameter, ft	Years of Operation	Daily Iron Tonnage	Coke Rate, lb per ton of Iron	Flue Dust Rate, lb per ton of Iron	Years of Operation	Daily Iron Tonnage	Coke Rate, lb per ton of Iron	Flue Dust Rate, lb per ton of Iron
1	25½	8	958	1993	350	3	1130	1825	334
2	25½	3	980	1880	244	8	1115	1856	252
3	27 & 28	3	1100	1900	272	8	1257	1813	148
4	22	2	929	1638	133	5	973	1630	50
5	25½	4½	949	2025	83	2	1142	2001	183
6	27 & 28	1	1358	1651	341	5	1390	1887	188
7	27 & 28	1½	1038	1798	378	5	1232	1843	158

"Ability of a pressure furnace to use inferior raw materials is important. Few plants abroad have enough high-grade ores and coals" . . .

operated primarily to produce as much pig iron as possible. Due to ore shortages, the furnace at Colvilles has not been blown as hard as usual for short periods of time and some coke savings have been realized. However, experience at lower wind volumes has not been sufficient to determine conclusively what reduction in coke rate could be effected.

Blast furnacemen have found it possible on all pressure furnaces to increase wind volumes 10 to 15 pct above the normal operating level without increasing the coke rate, and in many cases actually reducing it. Without the addition of top pressure to the blast furnace, increasing wind volume 10 to 15 pct would result in appreciably higher coke rates, as well as increased flue-dust production. Even at higher wind volumes, flue-dust production has averaged one-third less than it did on the same furnaces before being converted for pressure operation.

Low-shaft furnace tested

The ability of a pressure furnace to utilize inferior raw materials is another important point to overseas blast furnace operators. Few, if any, plants abroad have the plentiful supply of high-grade ores and coking coals available to our steel industry. This shortage has been the subject of much research.

The International Low-Shaft Blast Furnace Committee was established primarily to solve the problem of smelting iron with inferior raw materials. Theoretically, a low-shaft furnace should be able to utilize fuels with relatively poor resistance to crushing. However, to operate such a furnace with thermal efficiencies comparable to those of the conventional blast furnace, requires top-gas temperatures as low as those in the standard furnace. This necessitates a very steep temperature gradient through the furnace which can probably be obtained best by the use of an oxygen-enriched blast.

Although experiments have been conducted with the low-shaft blast furnace, particularly in Germany, none are in commercial operation anywhere in the world. Oxygen plants erected in Europe, primarily to supply an enriched blast to basic Bessemer converters, have also assured a source of low-cost tonnage oxygen for experimentation in the blast furnace.

The Organization for European Economic Cooperation, which had set up a commission to promote oxygen use in industry, suggested building a low-shaft blast furnace near Liege, Belgium, where the oxygen supply was adequate. Since such an undertaking required much larger capital expenditures than any single European country could afford, an international committee was established to obtain the necessary funds. This committee, known as the International Committee for Research in the Low-Shaft Furnace, received the necessary financial backing from seven European countries and the Battelle Memorial Institute and has built the furnace.

The aim of the Low-Shaft Blast Furnace Committee is to determine the practicability of smelting iron, using raw materials easily accessible to the countries participating in the project. In addition to using an oxygen enriched blast, the low-shaft blast furnace has the necessary mechanical features and blowing equipment to operate at top pressures as high as 33 psi.

The furnace plant, which has been in operation since May 1953, can produce 60 to 100 tons of pig iron per day using minette ores which contain about 32 pct Fe. Initially, the furnace will be operated using minette ores, coke made from low-grade European coals, and some raw coal.

The furnace can be operated with varying degrees of oxygen-enriched blast up to a maximum of 50 pct and top pressures from 1 to 33 psi. A burden preparation plant may be installed later adjacent to the low-shaft blast furnace for concentrating and agglomerating the various native ores. A homogeneous mixture of fine ore and fine fuel will eventually be bonded together and charged to the blast furnace.

Axial-flow compressors used

The furnace and its auxiliary equipment, exclusive of the burden preparation plant, cost more than $1 million. Although it may be some time before sufficient operating experience is gained to prove the economic feasibility of smelting low-grade ores with inferior fuels in a low-shaft furnace, this project is evidence of the active interest of European steel plant operators in developing new and better techniques for producing pig iron.

Use of axial-flow compressors for blowing blast furnaces is more widespread in Europe and the British Isles than in this country. In recent years, multistage axial-flow compressors have become commonplace in the petroleum refining and gas-utility fields. As a result, enough operating experience has been gained to prove their reliability as well as their energy requirements.

Axial-flow compressors are more efficient than centrifugal compressors at or near rated capacity. However, because of certain inherent disadvantages, their use for blast-furnace blowers has been debatable. While no axial compressors are known to have been ordered for

blast furnaces in this country, in Western Europe they are actually being constructed for blast furnace use.

Despite the disadvantages of axial compressors, Western Europe's blast furnace operators feel that fuel savings made possible by higher efficiencies more than offset the disadvantages. This is particularly important since fuel is more costly abroad than in this country.

The larger the volume of air required, the greater the advantage an axial-flow blower has over a centrifugal type. For small blast-furnace blowers, centrifugal-type compressors will probably continue to be used universally. The blast volume at which it becomes more economical to use an axial-flow compressor depends upon a number of conditions that vary widely among individual plants. Many steel plant operators in Europe feel that for blowers rated at 60,000 cfm or more, axial-flow compressors should be considered.

Disadvantages of axial-flow compressors are a much steeper pressure-volume characteristic and smaller stable operating range. Despite the steep pressure-volume curve, it is possible to operate in the range of 60 to 100 pct of the rated output of the blower and still achieve substantial fuel economies. If air volumes less than 60 pct of capacity must be used, the blower must operate at a higher level of output and excess air is bled to the atmosphere.

A similar condition exists with centrifugal compressors but they can be operated at a lower percentage of capacity before it is necessary to bleed to atmosphere. European blast furnacemen feel that blast-furnace blowers will operate at efficient levels enough of the time to expect average fuel savings of at least 10 pct.

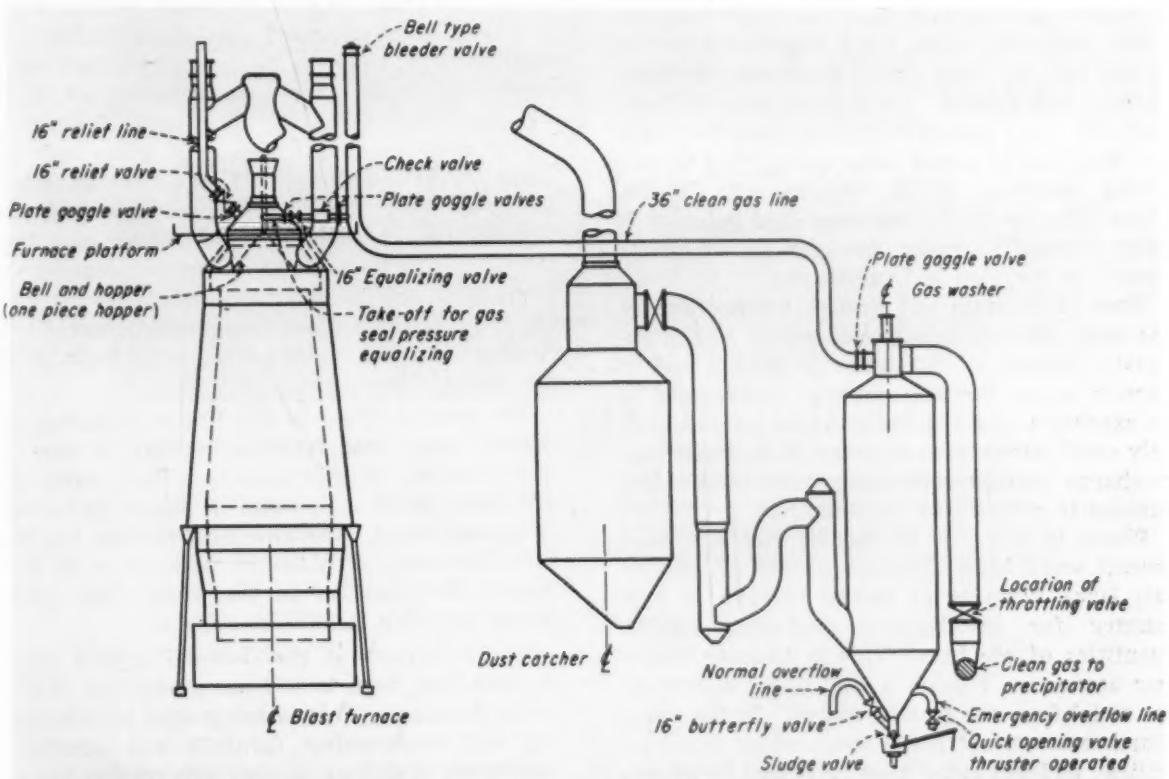
The steel industries of France, Belgium, and Luxembourg are based on the use of minette ores. These ores are located principally in the Lorraine district of France with one end of the ore body extending into a part of Luxembourg. The minette ores are low in iron, containing about 32 pct Fe, and high in phosphorus. Pig iron made from these ores is most easily and economically refined to steel in the basic Bessemer converter because of its extremely high phosphorus content.

A typical analysis of pig iron made from minette ores is:

Element	*Pct*
Carbon	3.5
Phosphorus	1.8
Manganese	0.7
Silicon	0.4
Sulfur	0.09

Sulfur content of the hot metal is high and ladle desulfurization is used to reduce the sulfur to tolerable levels. Desulfurization is accomplished by adding commercial sodium carbonate to the ladle; the sulfur in the hot metal is reduced to about 0.03 pct.

Minette ores are not only low in iron and high in phosphorus, but also contain a high percent-



BLAST FURNACE diagram shows changes necessary for conversion to pressure operation. By increasing wind volume, reducing gas velocity through furnace, gas-solid contact is improved.

age of fines. Therefore, flue-dust production of furnaces using unagglomerated ores is apt to be high. These minette ores have certain advantages as they are easily reduced and are self-fluxing in character. Before the end of World War II, little or no preparation of minette ores was carried out prior to charging and the ore contained everything from very large lumps to fine dust. Since then, extensive burden preparation facilities have been installed at many plants.

The high cost of coke in Europe makes any reduction in coke consumption worth while. In crushing minette ores which are relatively soft, 25 to 30 pct fines are generated. In some plants, these fines are agglomerated while in others they are charged directly into the furnaces. In plants where fines are charged directly to the furnace, coke savings have been about 250 lb per metric ton of iron. In plants where the fines are agglomerated before furnace charging, coke savings of more than 350 lb per ton have been achieved.

Flue dust not excessive

Flue-dust production in furnaces using unagglomerated fine ores is rather high, as expected. In spite of this, it is debatable whether or not the additional coke savings possible by agglomeration of the fines are sufficient to warrant the additional costs of installing and operating the necessary agglomerating facilities. Much interest in the top-pressure blast furnace that has developed in areas using minette ores has resulted from its ability to utilize fine raw materials without producing excessive amounts of flue dust.

France and Belgium have their own coal deposits and coke ovens, but Luxembourg has to import all its coke from Germany, Belgium, Holland and France. Because of this, the Luxembourg steel industry agglomerates ore fines and flue-dust in rotary kilns rather than in sintering machines which require coke breeze. Since coke for the Luxembourg steel industry is quite expensive, many ore-preparation plants have been installed in Luxembourg.

Even in Belgium and France, where much of the steel industry is near coal mines, coal is expensive because of difficulties in mining coal in narrow seams far underground. Since coke is so expensive and the basic Bessemer can melt only small percentages of scrap, it is economical to charge as much scrap as possible to the blast furnace to reduce coke consumption.

Plants in this part of Europe generally have several small blast furnaces instead of one or two large furnaces as is the practice in this country for installations producing similar quantities of pig iron. This is because Bessemer converters require a continuous supply of hot metal from the blast furnaces. In the openhearth process, hot metal temperature is not as critical, and hot metal may be stored in mixers for much longer periods.

The Netherlands has only one integrated steel mill, The Royal Netherland Blast Furnaces and Steelworks at Ijmuiden. This plant has three blast furnaces which produce both merchant iron for sale to foundries and hot metal for openhearth furnaces. All steel in this plant is made by the openhearth process in five 200-ton capacity, all-basic-lined openhearth furnaces.

Since there is no iron ore in Holland, blast furnaces are located on tidewater and use high iron-content imported ores. Because of the demand for pig iron from these blast furnaces, a high percentage of Swedish magnetite sinter is used in the furnace burdens. Furnaces are blown at very high wind rates resulting in pig iron output well above the rated furnace capacity. Top temperatures of about 750°F are common with basic iron and are higher when high-silicon foundry iron is being smelted.

West Germany is the largest steel producer on the European continent with the exception of the U.S.S.R. Germany has little iron ore within its own borders and must depend on coal from the Ruhr and Saar Basins, and on minette ores from France and Luxembourg. Germany also imports several million tons a year of high-grade Swedish ores.

The only sizable deposits of domestic ore are located in the Salzgitter region. These ores are low in iron (30 pct) and high in silica (25 pct) and phosphorus. Germany has other small scattered deposits of low-grade ores, but none of these are large enough to be of much importance.

Furnace practice varies

Salzgitter ores are mined underground, concentrated by washing and gravity separation and agglomerated, but even the concentrates are relatively low grade. These concentrates are used by the steel plant at Watenstedt-Salzgitter where a pressure blast furnace is being built to smelt the Salzgitter ores. This plant was originally built by the Nazi government and, as planned, was to be the largest steel works in the world. After the war, the plant was completely dismantled but has since been partially rebuilt. At present, three blast furnaces are operating. Another is under construction, being built as a top-pressure furnace.

The present trend in the United Kingdom is toward large blast furnaces, similar in size to new furnaces in this country. Such furnaces are practical when operated in plants producing openhearth steel. The new blast furnace for the Steel Company of Wales is expected to be the largest blast furnace in the world when completed, probably in 1955.

Primary efforts in the United Kingdom since the war have been to increase production of existing furnaces. This is being done by rebuilding and modernizing furnaces and auxiliary equipment, installing burden preparation facilities, using carbon linings, and converting to high top-pressure operation.

Newport Steel SERVES CINCINNATI and a THOUSAND TOWNS BEYOND

This mill finds a ready market in the Queen City just across the Ohio River. Yet Newport serves many even larger territories throughout the expanding Midwest and South. Over rail and river and highway there flows a steady stream of coils and sheets, line pipe, roofing and siding, galvanized sheets, culverts, and all the other high-grade Newport products which customers over 68 years have come to prefer. New and modernized facilities, able management and experienced steelmakers, and nearness to America's fastest growing market for steel products, make Newport a most logical source of supply.

PRODUCTS OF NEWPORT STEEL

- Hot-Rolled Steel in Coil
- Hot-Rolled Pickled Steel in Coil
- Electric Weld Line Pipe
- Hot-Rolled Sheets
- Galvanized Sheets
- Galvannealed Sheets
- Colorbond Sheets
- Hot-Rolled Pickled Sheets
- Electrical Sheets
- Alloy Sheets
- Roofing and Siding
- Eave Trough and Conductor Pipe
- Culverts

ECONOMICAL WATERAIL DELIVERY

Newport Steel is situated on the Mississippi-Ohio River system and the great Cincinnati rail hub. With the advantage of location, new river barge facilities and seven major railroads, Newport gives economical, dependable delivery to industrial areas throughout the Middle West and South.

Newport Steel CORPORATION

NEWPORT, KENTUCKY

Hot Extrusion

Better fans made faster by preheating 14S slugs.

Aluminum wheels and fans with diameters from 2 to 4.5 in. and weights from 2 oz to 1½ lb are being extruded hot to finished sizes and difficult contours on a specially designed 1100-ton Lake Erie press at the Phoenix Div. of the Garrett Corp., Los Angeles.

With tolerances as low as 0.001 of an inch and produced at the rate of 100 per hour the wheels are used in air cooling, refrigeration and ram air turbines produced by AiRsearch for commercial and military aircraft.

Fans with 10 deep blades, bucket wheels with 30 precision buckets and radial air foil sections all to finished sizes are some of parts made by the unique process.

Use of a ram force of 350 tons and a die clamping pressure of 750 tons concentrated in a 2 to 3 sq in. area makes the press operation unique. Press action is unusually fast.

Press Action Fast

Tough alloys such as aluminum alloy 14S, tensile strength 60,000 psi, make strong fans but complicate the problem of extrusion.

Previously produced by hand duplicating which took 4 hours per fan the 100 per hour rate represents a considerable saving. In addition, quality of the parts is far superior. In machined fans, the axially oriented grain structure is unchanged.

Wheels Are Stronger

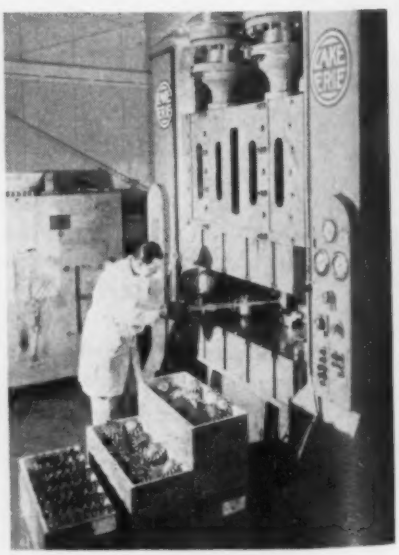
By extruding, the grain flow is changed to a radial flow out to the ends of the blades making a stronger, better made wheel. Strength is an important factor for the wheels which spin at speeds up to 100,000 rpm.

The press itself, which weighs 100 tons, was built by Lake Erie to AiResearch specifications. It is

IF YOU WANT MORE DATA

You may secure additional information on any item briefed in this section by using the reply card on page 87. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

Preheat to 950° F . . .



Output 100 per hour . . .

PUNCHES
DIES · RIVET SETS
COMPRESSION
RIVETER DIES
Made of highest standards and uniform quality thus insuring maximum service. Since 1903
Large inventory of stock sizes of round punches and dies, also rivet sets available for immediate shipment. Square, rectangular, oblong and elliptical shapes made to order.
Write Dept. B for Catalog 46
GEO. F. MARCHANT COMPANY
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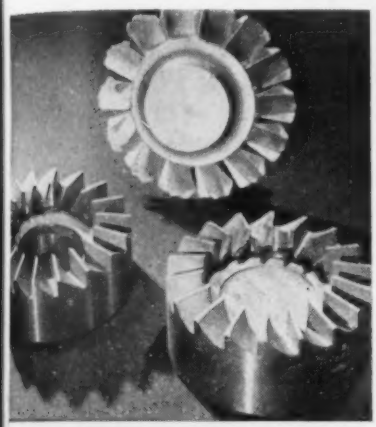
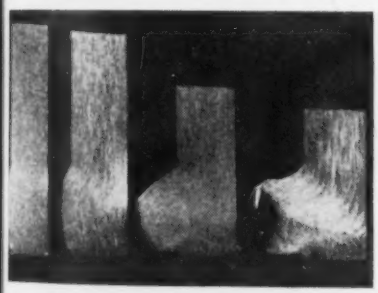
electrically driven, self-contained and hydraulically operated. Controlled electro-hydraulically, the press is water cooled and has a nitrogen bottle type accumulator. The dies are made by AiResearch from high alloy steel.

Slugs Preheated

The aluminum slugs are preheated in an oven, placed in the press die with long handled tongs and extruded in a matter of sec-



High alloy steel dies . . .



Grain flow changed . . .

Spin to 100,000 rpm . . .

Turn Page

10 cutting edges on one KENDEX* tool!

No tool grinding expense and *minimum* machine down time for tool changing—these are the advantages you obtain from multiple-edge Kendex "throw-away" insert tools. For example:

A Kendex round insert, used to bore 2½" cast iron stators, machined 300 pieces before one cutting edge dulled. Then, without removing the shank from the boring bar, the "button" was revolved to a new cutting position, until 3,000 stators were machined with the insert's 10 cutting edges. Best previous performance, by a conventional brazed tool, was 400 stators per tool grind.

Kendex precision-ground buttons have Kennametal's high wear-resistance, for long life. Screw-mounted, they can be rotated in seconds to new cutting positions without removing or resetting the tool holder . . . a great time-saving feature. When all cutting edges are used, the insert is thrown away—replacement cost is slight compared to that of regrinding.

Only Kennametal makes Kendex "throw-away" inserts. Ask your nearest Kennametal tool representative to help you apply this cost-saving tooling to suitable operations in your plant. Kennametal Inc., Latrobe, Pa.

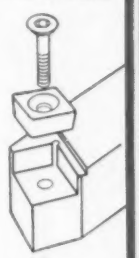
*Registered Trade-Marks

How KENDEX* Works

1

Hard, strong, wear-resistant Kennametal is molded into square, round, or triangular Kendex inserts, which are precision ground.

2



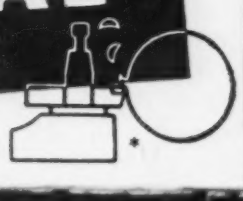
Kendex inserts are mounted to suitable tool holders with socket head screws.

3

When edge becomes dull, insert is turned to new cutting position. When all cutting edges have been used, insert is thrown away; no regrinding.

KENNAMETAL*

CEMENTED CARBIDE TOOLING THAT INCREASES PRODUCTIVITY



A-8

SALES OFFICES IN PRINCIPAL CITIES

Heaters keep die temperatures even . . . New control system designed.

onds. Once cooled the fans are either sent to heat treat or to be machined directly depending upon the alloy. Machining consists of work only on the bore, hub or outer diameter. No contour machining is necessary.

Several problems were confronted in the initial operation of the press. Erratic die temperatures were controlled with the installation of five heaters in the die itself. Three were mounted above and two below, all controlled by thermostats. Highly stressed insulation pads prevented the die heat from affecting the press.

A redesigned control system eliminated initial control problems. The speed of the press caused a lag of time with the controlling instruments and necessitated a change in valves to get a better control reaction time. Excessive slack was reduced with the installation of large guide posts or leader pins.

Cowles

DRYORTH*

Anhydrous Sodium Orthosilicate

High-powered Cleaning at Low Cost

• Cowles DRYORTH is free-flowing, granular, dust-free. It contains not less than 60% Na_2O and is quickly and completely soluble.

DRYORTH is a fast, economical cleaner for

★ strip and sheet steel
★ steel pipe — before galvanizing
★ heavy ferrous parts and castings

Try DRYORTH for these and other basic cleaning operations. DRYORTH — anhydrous sodium orthosilicate — assures long cleaning mileage at low cost.

*Reg. U. S. Pat. Off.

Cowles also manufactures a complete line of cleaners engineered to handle all kinds of cleaning problems on both ferrous and non-ferrous metals. The Cowles Technical Man in your area will be glad to discuss any metal cleaning problems you have. Write us today!

COWLES CHEMICAL COMPANY
7016 Euclid Avenue
Cleveland 3, Ohio

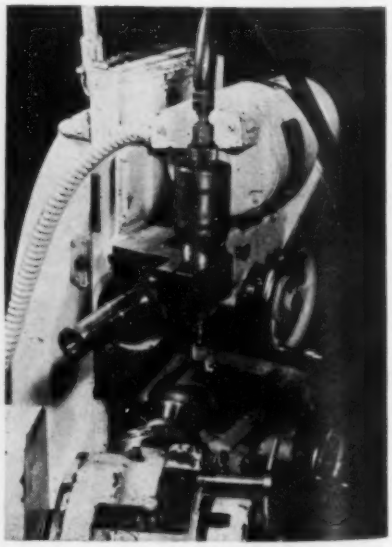
Grinding:

Adapter proves aid in sharpening special cutters.

An adapter for the Cincinnati grinding machine which permits it to be used for vertical grinding is expected to save $4000 a year for Chance Vought Aircraft plant at Dallas, Texas.

The adapter comes to the main spindle housing and holds the grinder in a vertical position. This allows the grinder to swivel in a direction parallel with the main spindle. Tapered helical cutters can then be re-fluted with little trouble and the arrangement expedites making of new ones.

A ¼ hp air motor equipped with a small cutting stone makes an accurate cut on the helix and rake angle of the spiral tapered end mills. This prolongs the life of these mills by assuring a true cut. They can be resharpened up to eight times instead of the old average of twice. The adapter costs about $100 to make.



Longer cutter life . . .

THE IRON AGE SUMMARY . . .

- **Steel upturn will come later than expected**
- **Stainless, and tinplate outlook seen brighter**
- **Scrap industry haunted by lack of new orders**

There is **little chance** that steel business will perk up as fast as producers had expected. The ingot rate has settled into a mid-70 groove from which it is not expected to deviate more than a few points during the next several weeks.

But steel sales people haven't given up on their market. A number of them still expect an upturn in business, although they now look for it to come later than had originally been anticipated. That would be some time in March.

Steel firms **are scrutinizing** their operations to improve their operating efficiency and their customer service. One of the things they have learned is that they can book, make and deliver steel a great deal faster than they thought they could. The faster service is being demanded and obtained by inventory conscious customers.

There are growing indications that some products are due for a pickup. Settlement of the can company strike has helped tinplate producers, although some of them are still loaded with inventories accumulated during the strike. One large producer believes tinplate output for the year may average 80 pct of capacity.

Also, stainless steel business is snapping back, and producers are convinced the worst is behind them—at least for a while. Hurry-up orders indicate that some users might have carried their inventory correction too far.

Oil country goods and structurals are still the strongest props in the market. Overall flat-rolled demand is at a fair level but varies widely among consumers and producers. Plate demand is fair, with all types available. Market for mechanical tubing and pressure tubing is saturated. Some special wire products are improving, but merchant wire remains in a bad slump. Bars are very competitive.

Steel **customers are winning** additional concessions on freight and extra charges. And premium prices have practically melted away. Yet regular mill base prices remain firm. Steel producers will be reluctant to make any major price changes until a new wage contract has been negotiated. Current agreements with most companies expire June 30 of this year.

Inventory correction continues and each week a number of consumers return to the market. But so far renewed buying has been only enough to hold business at current levels. Indications are that correction will continue to be a very gradual process.

Steel warehouses have passed their low point and business is expected to pick up moderately. Some warehouses were particularly hard hit during December and January. And there has been some price nicking to get inventories in better balance. This distress material is believed to have been pretty well cleaned up.

Lack of demand continues to haunt the scrap industry. THE IRON AGE Steel Scrap Composite Price is off another 83¢ a ton to $27.67 per gross ton.

Steelmaking operations this week are scheduled at 74.0 pct of rated capacity, down half a point from last week.

Steel Output, Operating Rates

	This Week†	Last Week	Month Ago	Year Ago
Net Tons Produced (000 omitted)	1,760	1,766	1,706	2,204
Ingot Production Index (1947—49=100)	109.6	109.9	106.2	139.4
District Operating Rates				
Pittsburgh	85.0	86.0*	75.0	107.0
Chicago	81.0	81.0*	87.0	97.5
Philadelphia	78.0	78.0	70.0	96.0
Valley	74.0	71.0*	58.0	102.0
West	78.0	78.0*	76.5	106.0
Cleveland	78.0	82.5*	51.0	95.5
Buffalo	71.0	63.5	52.0	94.0
Detroit	89.0	85.0*	82.0	104.0
Birmingham	87.0	87.0	80.5	96.0
Wheeling	77.0	81.0*	73.0	101.0
S. Ohio River	77.0	78.0*	80.0	93.0
St. Louis	48.0	65.0	83.0	101.0
East	62.0	61.0*	67.0	96.0
Aggregate	74.0	74.5	74.0	99.5

Per cent of capacity for weeks in 1954 is based on annual capacity of 124,330,410 net tons as of Jan. 1, 1954. Per cent of capacity for last year is based on annual capacity of 117,547,470 tons as of Jan. 1, 1953.

* Revised.
† Tentative.

"Yes...you can make it in stainless.

Free-Machining ENDURO is fully 90% as machinable as Bessemer screw stock"

You can give parts the high physical and chemical properties of ENDURO Stainless Steel—and, at the same time, maintain high rates of automatic production.

You do it by converting to ENDURO bars which are cold-finished by Republic's Union Drawn Steel Division. Two grades are fully 90% as machinable as Bessemer screw stock.

They offer close tolerance, accuracy of section, uniform soundness, and fine surface finish.

Republic ENDURO Stainless Steel also is available in hot-rolled bars and in wire. And, Republic metallurgists are ready to help you every step of the way in selecting and applying the proper grades for best production. Just write:

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FREE-MACHINING
STAINLESS STEEL

REPUBLIC STEEL

Other Republic Products include Carbon and Alloy Steels—Pipe, Sheets, Strip, Plates, Bars, Wire, Pig Iron, Bolts and Nuts, Tubing

Markets at a Glance

Iron and Steel Expansion . . . Expenditures by iron and steel companies for plant expansion and improvement amounted to third biggest outlay in industry's history. Companies estimate that $775 million will be invested in 1954. Medium and small companies share the effort with larger companies.

U. S. Steel Forms Subsidiary . . . A new subsidiary of the United States Steel Corp., organized for the purpose of assisting and financing the products of U. S. Steel Homes, Inc., has been formed. New organization will offer mortgage financial assistance to builders of U. S. Steel homes who qualify for such assistance.

Steelmaking Rate Rise . . . Steelmaking operations in the Canton-Massilon area are on the rise. Within the past 30 days Republic Steel Corp. has refired a 95-ton open hearth at Massilon. Timken Roller Bearing Co. also placed a 40-ton electric furnace back in service. About 80 idle men have been called back to work by the two firms. Republic is now operating 9 out of 15 furnaces in the area. Timken, currently operating at 72 pct of capacity, is producing alloy steel in six of its nine electrics.

Payroll Nears Peak . . . Average hourly payroll cost of wage earners in the iron and steel industry was $2.323 in November, the highest ever paid except the peak of $2.328 reached in September. Estimated payroll for whole industry for 11 months exceeded any previous year's total. Employment fell slightly but remained higher than at any time prior to early 1951 reports American Iron and Steel Institute.

Build Aluminum Plant . . . Aluminum Co. of Canada together with Sociedad A de Alumino is constructing a plant with 20,000 ton annual capacity at Alicanet, Spain. Some U. S. capital has been appropriated by a U. S. economic group in Madrid to help equip plant.

Raise Steel Capacity . . . Canadian steel production capacity increased by slightly more than a million tons during 1953, but the closing down of the openhearth shop for dismantling at the Hamilton Works of Steel Co. of Canada Ltd. will lower capacity figures for the Canadian steel industry.

Lay Off Autoworkers . . . Chrysler Corp. will lay off 150 Plymouth, Dodge and Dodge truck workers at its San Leandro, Calif., plant this week. This brings the cuts from a December workforce of 1800 to a total of about 350. The firm's Los Angeles plant, which assembles Chryslers and De Sotos has had comparable layoffs, equal to about a 10 pct production cut.

Castings Expansion Revision . . . Revised figures on the expansion goal for gray iron castings over 3000 lb show that to date 15.5 pct of the expansion goal has been authorized. Tax amortization applications now pending bring the total close to 20 pct.

Distributor Appointed . . . Joseph T. Ryerson & Son, Inc. is now distributing plastic pipe and fittings produced by Carlon Products Corp. Products handled include both flexible and rigid Carlon plastic pipe.

Buys Self-Unloader . . . Oglebay-Norton & Co. have purchased two self-unloading steamers from J. A. Paisley Steamship Co. Acquisition of the *R. J. Paisley* and *Ben E. Tate* through the Columbia Transportation Co. brings Columbia's self-unloader division up to seven vessels. In addition to the self-unloaders Columbia operates ten bulk vessels and five crane vessels on the Lakes.

Pig Iron Production . . . Canadian pig iron production is holding at record high level but unused capacity is well above that of a year ago.

Prices At A Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite prices				
Finished Steel, base	4.634	4.634	4.634	4.376
Pig Iron (gross ton)	$56.59	$56.59	$56.59	$55.26
Scrap, No. 1 hvy. (Gross ton)	$27.67	$28.50	$30.17	$42.00
Nonferrous metals				
Aluminum, ingot	21.50	21.50	21.50	20.50
Copper, electrolytic	29.75	29.75	29.75	24.50
Lead, St. Louis	12.80	12.80	13.30	13.80
Magnesium, ingot	27.75	27.75	27.00	24.50
Nickel, electrolytic	63.08	63.08	63.08	63.08
Tin, Straits, N. Y.	84.50	84.50	84.50	$1.21½
Zinc, E. St. Louis	9.50	9.50	10.00	12.00

Metals Quiet Following Price Cuts

Lead, zinc business limited . . . London prices rebound, may forecast rises in U. S. . . . Smelter cutback brings total to 8000 tons per month—By *R. L. Hatschek.*

Following the ½¢ per lb price cuts registered early last week in both lead and zinc these twin metals stayed definitely in the sidelines. This, of course, is not unusual as most consumers stay out of these markets to wait and see if the bottom has been reached. What buying is done is usually to fill immediate needs and is generally placed on an average price basis.

But there was definite rebound activity on the London Metals Exchange during the past week. Continual increases to Friday brought the Jan. bid prices to the delivered New York equivalent of 10.375¢ for zinc and 12.53¢ for lead. U. S. prices at the same time were 10.00¢ and 13.00¢, respectively.

May Act Fast . . . With zinc at the lowest level it's hit since late in 1949, it would seem that a quick rebound in domestic prices might be in the books. The producers certainly aren't very happy with the 9.50¢ f.o.b. East St. Louis quotation and with London above the New York equivalent they could move.

Lead's not as bad off as zinc, though, and London is still lower than the U. S. market. Demand in this country has been holding up better than zinc but it seems that London would have to rise a bit higher before a U. S. increase could be justified.

Another Zinc Cut . . . Bunker Hill & Sullivan Mining Co. has announced it will trim slab zinc smelting by 25 pct effective Feb. 1. This cut amounts to approximately 1200 tons monthly and brings the total of smelter cutbacks announced in the past few months to about 8000 tons monthly.

Production last October, latest month before the cuts, was 84,031 tons and was the highest for the year. Monthly average was 80,911 tons. Latest cut is favorably received by the trade but it's felt that more cuts are needed. With smelter stocks standing at 180,620 tons at the first of the year, it will take quite a while to work off the fat and permit better prices. Average monthly shipments for 1953 were only 73,128 tons and toward year end they were running considerably less than that.

Boost Nickel Shipments . . . Good news from Canada is that International Nickel Co. has made its first shipment of its 2 million lb per month production increase. But it isn't good news for nickel-shy civilian consumers. Inco has boosted its delivery rate by that quantity but it's all going into the U. S. stockpile.

So is most of the metal from the government-owned Nicaro plant and civilian users are being trimmed by a 1.5-million-lb per month increase in government nickel stockpiling. A similar boost may hit in February but anguished cries from hurting nickel users may temper the stockpile appetite.

Trim Setasides . . . The government is setting aside less steel, copper and aluminum for defense products than it did in the first quarter. Here's the lineup for the coming quarter: Steel, 1,273,720 tons; copper, 66,502 tons; aluminum, 71,508 tons. Setasides in the first quarter were 1,455,840 tons for steel, 83,658 tons for copper, and 83,854 tons for aluminum. Reductions are 13 pct, 20 pct and 15 pct, respectively.

It all means that you can get more of these metals next quarter —if you want more.

See Magnesium Boost . . . After reporting a decline in magnesium wrought products shipments for November, the Magnesium Assn. predicts an upturn before spring. The November shipments of wrought magnesium totaled only 705 tons reflecting military stretchouts.

Primary magnesium production during the fourth quarter was higher than the preceding quarter, totaling 19,035 tons and bringing the 1953 total to 93,075 tons.

The Bureau of Mines release, however, needs a bit of clarification. It said: "Production . . came from . . . Freeport, Tex., and the government-owned plant at Velasco, Tex., which is scheduled to be operated by Dow Chemical Co. for the government until June 30, 1954."

This is the termination date of the contract for stockpile purchasing and Dow expects to continue operations there. Whether the stockpile contract will be renewed is unknown.

NONFERROUS METAL PRICES

(Cents per lb except as noted)

	Jan. 20	Jan. 21	Jan. 22	Jan. 23	Jan. 25	Jan. 26
Copper, electro, Conn.	29.50–30.00	29.50–30.00	29.50–30.00	29.50–30.00	29.50–30.00	29.50–30.00
Copper, Lake delivered	30.00	30.00	30.00	30.00	30.00	30.00
Tin, Straits, New York	85.25	84.75	84.75	....	84.50	84.50*
Zinc, East St. Louis	9.50	9.50	9.50	9.50	9.50	9.50
Lead, St. Louis	12.80	12.80	12.80	12.80	12.80	12.80

Note: Quotations are going prices
*Tentative

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Applying tool and die steels for best results *is* a science . . . and even "old hands" in the business sometimes run into problems. Have you ever wondered where you can go to ease your own headaches and worries in this respect . . . what you can do to keep your tools and dies on a more dependable production schedule?

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Regardless of who made the tool or die steel you're using . . . if you're seeking improved tool and die results—"tired" of sweating out problems alone—a Carpenter Representative stands ready to join your team now. His experience on tooling, heat treating and trouble-shooting means tangible benefits for you.

And here's additional help, too. A call to your Carpenter Mill-Branch Warehouse, Office or Distributor can bring fast information on prices, sizes and grades of Carpenter tool, alloy and stainless steels. You get a direct line to printed service literature that you'll find helpful day after day. And if necessary, Metallurgical Counsel is available from the Reading Mill.

If you believe that all steel warehouse services leave something to be desired, we offer you this challenge: Call your Carpenter Mill-Branch Warehouse, Office or Distributor and see if it doesn't lead to a profitable difference in your own plant setup. The Carpenter Steel Co., 121 West Bern St., Reading, Pa.

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Immediate delivery from large stocks

SPECIALTY TOOL • ALLOY and STAINLESS STEELS

Nonferrous Prices

(Effective Jan. 26, 1954)

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt. frt. allowed)

Flat Sheet: 0.136 in. and thicker, 2S, 3S, 53.9¢; 4S, 36.0¢; 52S, 38.2¢; 24S-O, 24S-OAL, 37.0¢; 75S-O, 75S-OAL, 44.7¢; 0.081-in., 2S, 3S, 35.1¢; 4S, 37.7¢; 52S, 39.9¢; 24S-O, 24S-OAL, 38.4¢; 75S-O, 75S-OAL, 46.9¢. 0.032-in., 2S, 3S, 37.0¢; 4S, 41.8¢; 24S-O, 24S-OAL, 46.9¢; 75S-O, 75S-OAL, 58.4¢.

Plate, ¼-in. and Heavier: 2S-F, 3S-F, 32.4¢; 4S-F, 34.5¢; 52S-F, 36.2¢; 61S-O, 35.6¢; 24S-O, 24S-OAL, 36.9¢; 75S-O, 75S-OAL, 44.3¢.

Extruded Solid Shapes: Shape factors 1 to 5, 36.5¢ to 82.8¢; 12 to 14, 37.2¢ to 99.0¢; 24 to 26, 39.9¢ to $1.29; 36 to 38, 47.2¢ to $1.89.

Rod, Rolled: 1.064 to 4.5-in., 2S-F, 3S-F, 43.8¢ to 37.2¢; cold-finished, 0.375 to 3.499-in., 2S-F, 3S-F, 47.6¢ to 39.3¢.

Screw Machine Stock: Rounds, 11S-T3, ½ to 11/32-in., 59.6¢ to 47.0¢; ⅜ to 1½-in., 46.6¢ to 43.8¢; 1 9/16 to 3-in., 42.7¢ to 39.9¢. Base 5000 lb.

Drawn Wire: Coiled 0.051 to 0.374-in., 2S, 44.1¢ to 32.4¢; 52S, 53.4¢ to 39.1¢; 17S-T4, 60.1¢ to 41.8¢; 61S-T4, 53.9¢ to 41.3¢.

Extruded Tubing: Rounds, 63S-T5, OD 1¼ to 2-in., 31.6¢ to 60.7¢; 2 to 4 in., 37.7¢ to 51.1¢; 4 to 6 in., 38.2¢ to 46.6¢; 6 to 9 in., 38.7¢ to 48.8¢.

Roofing Sheet: Flat, per sheet, 0.032-in., 42¾ x 60 in., $2.838; x 96 in., $4.543; x 120 in., $5.680; x 144 in., $6.816. Coiled sheet, per lb, 0.019 in. x 28 in.

Magnesium

(F.o.b. mill, freight allowed)

Sheet and plate: FS1-O¼ in., 66¢; 3/16 in., 68¢; ½ in., 70¢; B & S Gage 10, 71¢; 12, 75¢. Specifications grade higher. Base: 30,000 lb.

Extruded Round Rod: M, diam ¼ to 0.311 in., 77¢; ⅓ to ⅝ in., 60.5¢; 1⅛ to 1.749 in., 56¢; 2½ to 5 in., 51.5¢. Other alloys higher. Base up to ⅝ in. diam, 10,000 lb; ¾ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes: Rectangles: M. In weight per ft, for perimeters less than size indicated; 0.10 to 0.11 lb, 3.5 in., 65.3¢; 0.22 to 0.25 lb, 5.9 in., 62.3¢; 0.50 to 0.59 lb, 8.6 in., 59.7¢; 1.8 to 2.59 lb, 19.5 in., 56.8¢; 4 to 6 lb, 28 in., 52¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb; ½ to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: M, 0.049 to 0.057 in. wall thickness: OD, ¼ to 5/16 in., $1.43; 5/16 to ⅝ in., $1.29; ½ to ⅝ in., 96¢; 1 to 2 in., 79¢; 0.165 to 0.219 in. wall; OD, ⅝ to ¾ in., 64¢; 1 to 2 in., 60¢; 3 to 4 in., 59¢. Other alloys higher. Base, OD: Up to 1½ in., 10,000 lb; 1½ to 3 in., 20,000 lb; over 3 in., 30,000 lb.

Titanium

(100,000 lb base, f.o.b. mill)

Commercially pure and alloy grades; Sheets and strip, HR or CR, $15; Plate, HR, $12; Wire, rolled and/or drawn, $10; Bar, HR or forged, $6; Forgings, $6.

Nickel, Monel, Inconel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	86½	67½	92½
Strip, CR	92½	70½	98½
Rod, bar	82½	65½	88½
Angles, HR	82½	65½	88½
Plate, HR	84½	66½	90½
Seamless Tube	115½	100½	137½
Shot, blocks		60	

Copper, Brass, Bronze

(Freight included on 500 lb)

	Sheet	Rods	Extruded Shapes
Copper	46.41		48.48
Copper, h-r	48.38	44.73	
Copper, drawn		45.98	
Low brass	44.47	44.41	
Yellow brass	41.72	41.66	
Red brass	45.44	45.38	
Naval brass	45.76	40.07	41.33
Leaded brass			39.11
Com. bronze	46.95	46.89	
Mang. bronze	49.48	43.62	45.18
Phos. bronze	66.58	67.08	
Muntz metal	43.96	39.77	41.02
Ni silver, 10 pct	55.36		62.63

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed	21.50
Aluminum pig	20.00
Antimony, American, Laredo, Tex.	28.50
Beryllium copper, per lb conta'd Be.	$40.00
Beryllium aluminum 5% Be, Dollars per lb contained Be	$72.75
Bismuth, ton lots	$2.25
Cadmium, del'd	$2.00
Cobalt, 97-99% (per lb)	$2.60 to $2.67
Copper, electro, Conn. Valley	29.50 to 30.00
Copper, Lake, delivered	30.00
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$165 to $175
Lead, St. Louis	12.80
Lead, New York	13.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb., pig	27.00
Ingot	27.75
Magnesium, sticks, 100 to 500 lb.	46.00 to 48.00
Mercury, dollars per 76-lb flask, f.o.b. New York	$187 to $190
Nickel electro, f.o.b. N. Y. warehouse	63.08
Nickel oxide sinter, at Copper Creek, Ont., contained nickel	56.25
Palladium, dollars per troy oz.	$22 to $24
Platinum, dollars per troy oz.	$90 to $92
Silver, New York, cents per oz.	85.25
Tin, New York	84.50
Titanium, sponge	$5.00
Zinc, East St. Louis	9.50
Zinc, New York	10.00
Zirconium copper, 50 pct	$6.20

REMELTED METALS

Brass Ingot

(Cents per lb delivered carloads)

85-5-5-5 ingot	
No. 115	24.50
No. 120	23.75
No. 123	23.25
80-10-10 ingot	
No. 305	28.75
No. 315	26.50
88-10-2 ingot	
No. 210	37.50
No. 215	34.00
No. 245	29.50
Yellow ingot	
No. 405	20.75
Manganese bronze	
No. 421	25.25

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys	
0.30 copper, max.	22.25-23.00
0.60 copper, max.	22.00-22.75
Piston alloys (No. 122 type)	19.75-21.00
No. 12 alum. (No. 2 grade)	18.50-19.00
108 alloy	19.25-19.50
195 alloy	21.00-21.50
13 alloy (0.60 copper max.)	22.00-22.75
ASX-679	19.00-19.50

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—96-97½%	20.00-21.00
Grade 2—92-95%	19.25-20.00
Grade 3—90-92%	18.25-19.00
Grade 4—85-90%	16.75-17.50

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 5000 lb lots)

Copper	
Cast, oval, 15 in. or longer	44.54
Electrodeposited	38.38
Flat rolled	47.14
Brass, 80-20	
Cast, oval, 15 in. or longer	43.515
Zinc, flat cast	20.25
Ball, anodes	18.50
Nickel, 99 pct plus	
Cast	84.00
Cadmium	$2.15
Silver 999 fine, rolled, 100 oz. lots, per troy oz, f.o.b. Bridgeport, Conn.	94⅛

Chemicals

(Cents per lb, f.o.b. shipping points)

Copper cyanide, 100 lb drum	63.90
Copper sulfate, 99.5 crystals, bbl.	12.85
Nickel salts, single or double, 4-100 lb bags, frt. allowed	30.00
Nickel chloride, 375 lb drum	38.00
Silver cyanide, 100 oz. lots, per oz.	75½
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc cyanide, 100 lb drum	54.30

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	26	25¼
Yellow brass	19¾	18
Red brass	23	22¼
Comm. bronze	23⅜	23¼
Mang. bronze	18¾	17¾
Yellow brass rod ends	19½	

Custom Smelters' Scrap

(Cents per pound carload lots, delivered)

No. 1 copper wire	23	—23½
No. 2 copper wire		21½
Light copper		20
*Refinery brass		19

*Dry copper content.

Ingot Makers' Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	23	—23½
No. 2 copper wire	21	—21½
Light copper	19½	—20
No. 1 composition	17½	—18
No. 1 comp. turnings	17	—17½
Rolled brass	14½	—15
Brass pipe	15	—16
Radiators	13½	—13¾
Aluminum		
Mixed old cast	10	—11
Mixed new clips	11½	—12
Mixed turnings, dry	10¾	—11¼
Pots and pans	10	—11

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire	21½—22½
No. 2 heavy copper and wire	19½—20½
Light copper	17½—18½
New type shell cuttings	17½—18½
Auto radiators (unsweated)	11 —11½
No. 1 composition	15½—16
No. 1 composition turnings	15 —15½
Unlined red car boxes	13 —13½
Cocks and faucets	13 —13½
Mixed heavy yellow brass	9½—10
Old rolled brass	12½—13
Brass pipe	14½—15
New soft brass clippings	15½—16
Brass rod ends	13 —13½
No. 1 brass rod turnings	10¼—11

Aluminum

Alum. pistons and struts	5 — 6
Aluminum crankcases	8 — 9
2S aluminum clippings	11 —11½
Old sheet and utensils	8 — 9
Borings and turnings	5 — 6
Misc. cast aluminum	8 — 9
Dural clips (24S)	9 —10

Zinc

New zinc clippings	4½
Old zinc	3¼
Zinc routings	1¾
Old die cast scrap	3

Nickel and Monel

Pure nickel clippings	60	—65
Clean nickel turnings		40
Nickel anodes	60	—65
Nickel rod ends	60	—65
New Monel clippings	22	—24
Clean Monel turnings	14	—15
Old sheet Monel	20	—22
Nickel silver clippings, mixed		14
Nickel silver turnings, mixed		12

Lead

Soft, scrap, lead	9½—	9¾
Battery plates (dry)	5¼—	5½
Batteries, acid free		3¼

Magnesium

Segregated solids	20	—21
Castings	19	—20

Miscellaneous

Block tin	65	—67
No. 1 pewter	40	—42
No. 1 auto babbitt	37	—38
Mixed common babbitt	11	—12
Solder joints		14
Siphon tops		35
Small foundry type		14½
Monotype		13
Lino. and stereotype		12
Electrotype		10½
Hand picked type shells		7½
Lino. and stereo. dross		4½
Electro dross		3

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Prices May Go Lower Before Upturn

Market continues decline in most areas . . . Iron Age Composite dips 83¢ to $27.67 . . . No sizeable mill orders expected until late February at best . . . Sale forces Coast prices down.

Despite anguished cries of "It can't get any worse" from hard-pressed dealers and brokers, the scrap market kept right on declining. THE IRON AGE Steel Scrap Composite fell off another 83¢ this week to $27.67. And there was little reason to predict an upturn for some time to come. Trade observers in many districts feared the market would get still worse before it got better.

And on the West Coast a major buyer entered the market at depressed prices, forcing a $3 dip in No. 1 heavy melting in San Francisco and a $2 drop in the Seattle market. Buying was reported heavy in that area's first activity in some time.

Continued avoidance of buying by steel mills has complicated the pricing picture in several districts. Limited tonnages of No. 1 and No. 2 steel were sold in Pittsburgh for $30 and $27 respectively. Only mill buying in the Philadelphia district trimmed steelmaking prices another dollar. The market dipped about the same amount in Buffalo and in Cleveland and the Valley.

Some southeastern dealers who had been holding out for better prices apparently decided that improvement was too far off, released their material at going rates.

Pittsburgh — Everything points to continued weakness in this area. A large independent mill issued a stop order for 1 week on shipments from dealers. A second consumer is in the market for No. 1 bundles and No. 2 steel at $30 and $27, respectively, and purchased a limited tonnage at these prices. This, coupled with weakness in adjoining markets and declining prices in other grades, warranted a $1 drop in openhearth material.

Chicago—Scrap markets were at a virtual standstill last week. Yards were well stocked, as were mills, and brokers weren't interested in buying tonnage at virtually any price, with the result that many prices were nominal. Railroad was slipping again, as were electric furnace grades. Only mill sales in sight were expected to be largely industrial scrap, and small tonnages of even this grade. Little relief is expected before late February. Mills continued to list separate prices for No. 1 industrial heavy and No. 1 dealer heavy, but were buying little or nothing in the dealer grade. Correct price for No. 1 factory bundles in issue of Jan. 21, 1954, was $30-$31. It was incorrectly listed in that issue through a typographical error.

Philadelphia—Sole district mill doing any buying has trimmed $1 from its prices for No. 1 and No. 2 steel and No. 2 bundles. No. 1 bundles are going begging but are priced in sympathy with No. 1 heavy melting. Turnings grades are lower this week as are several grades of cast. A few small orders substantiated several low phos prices but electric furnace bundles are reduced on appraisal.

New York—Small orders from an adjacent district mill lowered heavy melting prices $2 in the lack of other business. No. 2 bundles were able to stay at last week's level by virtue of export sales, which bolstered demand somewhat.

Detroit—This market is standing still this week waiting the results of bidding in industrial lists. There will be no activity at the dealer level until industrial prices and tonnages are learned. A lot of last month's industrial scrap still hasn't found a home and is being laid down. Prices remain at the current level, but the outlook ahead is very gloomy.

Cleveland—Openhearth prices eased off from 50¢ to $1 in the Valley and Cleveland as another consumer held up shipments. Pricing adjustments resulted from appraisal of a market which some brokers believe will remain dormant for at least 45 more days. Bidding on industrial lists this week is expected to provide a more concrete basis for appraising the market.

Birmingham — Some southeastern scrap dealers this week appeared more disposed to release some of the steel scrap they have been holding. Evidently they have decided prices are not going to advance soon. A little better movement into the yards also is reported.

St. Louis—Steel rate for the St. Louis district is 48 pct, lowest since July, 1952. Therefore there is no buying of scrap by the steel mills, and none in prospect. Prices are nominal and mostly unchanged.

Cincinnati—Despite bearish outlook in most other areas some brokers and dealers here feel prices will go up when next mill buy is made. At press time there was not enough activity to warrant any change in prices.

Buffalo—Scrap prices fell another $1 per ton here as all leading consumers remained on the sidelines. Dealers' sentiments reached a low ebb as mills continued to work off reserve stocks which are still considerable. Dealer stocks are reaching alarming proportions. The top mill buyer has now been out of the market for about 2 months.

Boston — With the exception of small local sales of No. 1 heavy melting and low phos, 3 ft and under, in the Providence area, nothing was doing in steelmaking scrap in New England this week. These deals will probably be completed this week—and brokers anticipate a drop in these grades at that time.

West Coast—Major buyer moved into the market at reduced prices forcing No. 1 heavy melting in the San Francisco area down $3 to $20. Seattle market dipped $2 from $27 to $25. No. 2 heavy melting, Nos. 1, 2 and 3 bundles were also pushed down $2 and $3 in these markets. Buying was reported heavy in all categories in the Coast's first important sale in some time.

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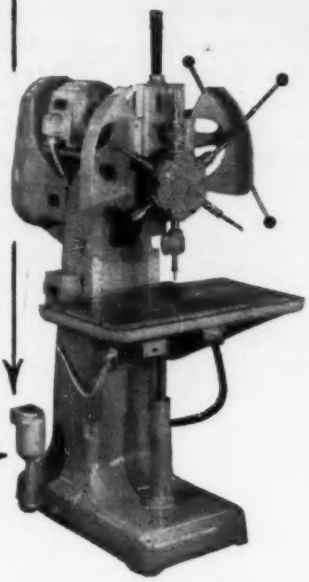

Illustrated is a Burgmaster Drill equipped with a Gusher Coolant Pump. Photo, courtesy Burg Tool Co.

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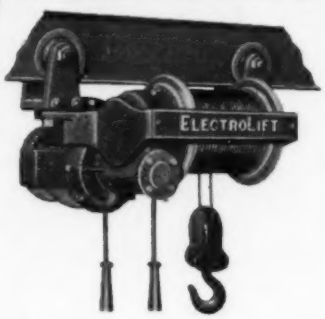

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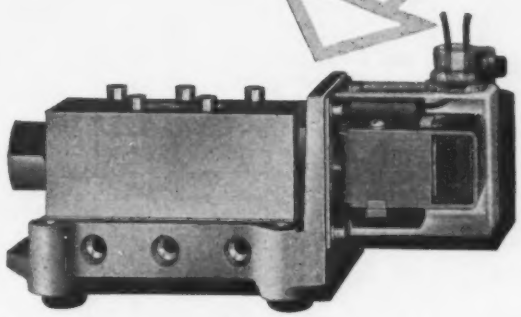

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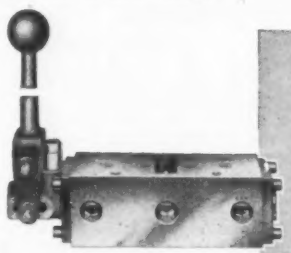
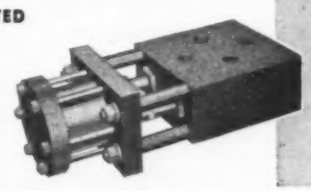


LEVER OPERATED SINGLE PLUNGER VALVES

Two position and three position valves, 3/8" to 1½" sizes; 2-way, 3-way and 4-way actions. Widely used for controlling the operation of single and double acting cylinders or as pilots for operating other valves.

PILOT CYLINDER OPERATED HYDRAULIC VALVES

Two position valves, ½" to 4" sizes, for line pressures from 1000 to 5000 psi. Valve is placed close to the work and operated from a central control point with an easy to handle air valve avoiding operator fatigue.



For Fully Descriptive Data Sheets Write

C. B. HUNT & SON, Inc.

Hand, Foot, Lever, Cam, Pilot, Diaphragm and Solenoid Control Valves

2041 EAST PERSHING STREET • SALEM, OHIO

RE-NU-BILT
GUARANTEED
ELECTRIC POWER EQUIPMENT

D. C. MOTORS

Qu.	H.P.	Make	Type	Volts	RPM
1	2200	G.E.	MCF	600	400/500
1	2000	Whse.	Mill	600	230/460
1	940	Whse.	QM	230	140/170
1	900	Whse.		250	450/550
1	825	Whse.		250	95/190
1	600	Al. Ch.		230	400/800
1	500	Whse.	CC-216	600	300/900
2	450	Whse.		550	415
1	400	G.E.	MCF	550	400/1050
1	300	Whse.	CB-5094	250	575/1150
1	200/300	G.E.	MPC	230	360/920
1	200	Rel.	1970T	230	720
1	200	Whse.	CB-5113	250	400/800
1	150	G.E.		600	250/750
1	150	Cr. Wh.	65H	230	1150
8	150	Cr. Wh.	83H-TEFC	230	900
1	150	Whse.	SK-151B	230	900/1800
1	150	Whse.	SK-201	230	380/950
1	50/120	G.E.	MCF	230	250/1000
2	100	Whse.	SK-181	230	450/1000
1	100	G.E.	CDP-115	230	1750

MILL & CRANE

1	50	G.E.	CO-1810	230	725
1	20	Whse.	K-3	230	975
4	15	Whse.	K-5	230	630
3	10	C.W.	SCM-AH	230	1150
1	10	G.E.	MD-104	230	400/800
3	6.25	Whse.	K-3	230	680
4	3	C.W.	SCM-FF	230	1750
2	3	Whse.	HK-2	230	835

A.C. MOTORS

3 phase—60 cycle

SLIP RING

Qu.	H.P.	Make	Type	Volts	Speed
1	1500	G.E.	MT-498	2300	360
1	1500	ABB		2300	720
1	1200	G.E.	MT	2300	275
2	1000	A.C.	Mill	2300	240
1	1000	G.E.	MT-452	2200	321
1	500	Whse.	CW	550	350
1	450	G.E.	IM	440	720
1	400	Whse.	CW-960A	440	1170
1	400	Whse.	CW	440	514
1	400	Whse.	CW-1218	2200	435
1	350	G.E.	MT-442Y	2200/4000	253
1	350	G.E.	IM-17A	440/2200	720
1	300	Whse.	CS	440	1170
1	250	G.E.	MT-424-Y	4000	257
1	250	G.E.	MT-559S	2200	1800
1	250	Al. Ch.		550	600
1	200	Cr. Wh.	26QB	440	505
1	200	G.E.	IM-16	440	600
1	200	G.E.	IM	440	435
1	200	G.E.	MTP	440	1170
1	150(unused)	Whse.	CW	2200	435
1	150	G.E.	IM-16	440	600
2	125	A.C.		440	885
1	125	Al. Ch.		440	720
4	125	G.E.	MT-566Y	440/2200	435
1	100	G.E.	IM	440	600
4	100	A.C.	ANY	440	695

SQUIRREL CAGE

2	650	G.E.	FT-559BY	440	3570
2	450	Whse.	CS-1420	2300/4150	354
1	200	G.E.	IK-17	440	580
3	200	G.E.	KT-557	440	1800
1	150	Whse.	CS-8568	440	880
1	150	Whse.	CS	440	580
1	150/75	G.E.	IK	440	900/450
2	125	Al. Ch.	ARW	2200	1750

SYNCHRONOUS

2	3500	G.E.	TS	2300	257
2	2100	G.E.	ATI	2300	360
2	1750	G.E.	ATI	2300	3600
2	2000	Whse.		2300	120
3	735	G.E.	ATI	2200/12000	600
1	450	Whse.		2200	450
2	350	G.E.	TS	2200	156

M-G Sets—3 Ph. 60 Cy.

Qu.	K.W.	Make	RPM	D.C. Volts	A.C. Volts
2	2000/2400	G.E.	450	250/300	2300/4600
2	1750/2100	G.E.	514	250/300	2300/4600
1	2000	G.E.	500 25cg	600	11000
2	2000	G.E.	514	600	6600/13200
1	1500	G.E.	720	600	6600/13200
1	1500	C.W.	514	30/115	4000/13000
2	1000	Whse.	900	600	4160
1	1000	G.E.	900	260	6890
1	1000(3U)	G.E.	900	250	2200
1	750	Whse.	900	275	4160
1	750	C.W.	514	30/115	2300
1	600	G.E.	720	250	440/2300

TRANSFORMERS

Qu.	KVA	Make	Type	Ph.	Voltages
1	5000	Whse.	OISC	3	3300x26400
1	3500	G.E.	WCT	3	13800/6900x2300
1	2500	Whse.	OISC	3	26400/13200x460
3	2000	G.E.	HVDDJ	1	66000x13800
2	1750	G.E.	WCT	3	13800/6900x2300
1	1500	G.E.	HT	3	13200x2300

FREQUENCY CHANGER SETS

Qu.	KW	Make	Freq.	Voltages
1	12500	Whse.	25/60	13200/13200
1	3000	G.E.	25/60	2300/2300/4000
2	2500	G.E.	25/62.5	2300/2300
1	1000	G.E.	25/58.3	4400/2300
1	500	Al. Ch.	2560	11000/2300

BELYEA COMPANY, INC.
47 Howell Street, Jersey City 6, N. J.

The Clearing House

NEWS OF USED AND REBUILT MACHINERY

Looking, Not Buying . . . Number of window shoppers strolling along Chicago's Machinery Row has increased recently but most of them are keeping their hands in their pockets. As a result there has been no increase in sales.

Pickup in rebuilding reported in some other areas seems to have bypassed Chicago. Business is described as "about the same" or "average." Rebuilder's backlogs are comfortable but as deliveries speed up more and more of these firms are out seeking business.

More Time Payments . . . Chicago used machinery dealers are working harder than ever to improve customer service. The number of time buying arrangements began to increase after July and this trend has continued ever since. Dealers say time payments have proven themselves as a sales tool.

Generally, prices in the Chicago area have become more elastic. One problem, however, is that some purchasers are trying to beat down prices for sole purpose of being able to say they drove a bargain. In one recent case involving sale of a $9000 piece of equipment, the customer refused to buy until $90 was knocked off the asking price. On a sale of this size the reduction was nominal but it nevertheless clinched the transaction.

Ask Too Much . . . A few dealers report they are having difficulty with trade-ins as some prospective buyers want far too much for their old machines. Instead of basing their asking figure on today's price-softening market they are trying to get as much as they might have two years ago. Dealers have an important re-education job to do in this matter.

Ever since Machinery Dealers National Assn. released its first sales statistics last month (THE IRON AGE, Dec. 17, 1953, p. 174) covering the first six months of 1953, there has been considerable speculation about how much of a business drop will be shown in figures covering the second half. Dealer estimates on the dip range from 25 pct to 50 pct with more of them backing the higher figure.

Not Pessimistic . . . Some dealers in the Philadelphia area are fairly hopeful for relatively normal business in 1954. The Delaware Valley region has seen considerable industrial expansion in recent years and there are still more plants being built. At the same time, more used equipment is coming into the market as established plants decide they won't be needing some of their tools.

Heavy consumer resistance is being felt to the still-high asking prices. New machinery can be obtained in 3 to 4 months so nobody wants to pay 70 or 80 pct of new prices for old equipment. People in the trade feel that the leveling-off point will be when used prices are about 50 to 60 pct of new on equipment dated 1940 or later.

While no types are as tight as they were six months ago, there is still fairly strong demand for almost any large tools—mostly horizontal boring mills, big radial drills and large surface grinders.

Push on Freight Rates . . . Fate of MDNA's attempt to get a freight rate reclassification is now up to railroad and truck freight rate classification committees. MDNA appeal for a better break on freight rates was made in Chicago Jan. 13 and 14 by Thomas Scanlon, Chicago freight consultant.

Mr. Scanlon may be asked to appear again before the truck and railroad freight committees to give additional information. Decision by these groups is not expected for about two months. They will then make recommendations to the Interstate Commerce Commission on whether there should be a reclassification of used machinery freight rates.